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FOOD INDUSTRIES

VICTORY LOAN

• FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

andard bakery mixer used making plum pudding

NOVEMBER 1945

Your Organization Stagnating?

Pudding Production Streamlined

How To Make Canned Hamburgers

Quick Cooler Improves Butter

Ways To Save Water In Food Plants

Jobs for Wounded Veterans

Deveining and Freezing Shrimp

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THE COVER

To meet the demands of the armed forces for canned plum pudding, Kroger Grocery & Baking Co. had to develop new methods to put the operation on a mass-production basis. How they did it is told in an article starting on page 74. On the cover is shown the beater-arm, tilting bakery mixer in which the ingredients are creamed and blended.

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Time To Use Common Sense

POSTWAR realities are now revealing developments reminiscent of the rigid framework in which business was required to operate in NRA days. It recalls those unlamented days, but does not exactly parallel them. For in the middle 'thirties there were no war plants to be reconverted back to products of peace. Nor were there price ceilings. But there were floors under wages. Today we have — not floors — but powerful jacks that tend to force wages and costs higher.

Economic theory in Washington is being given a glorious experimental test. Under OPA control, prices may not be increased except under most elaborate restrictions. Yet the lid is off on wage and salary increases provided selling prices are not thereby increased. It's a good trick if you can do it.

The theory is that a larger volume of sales can be achieved, under a semblance of 1941 prices, than the potential volume that could be achieved if higher prices prevailed today. Also that the increased volume of sales will increase employment as everyone desires. But there is still a fly in the ointment. The idea in Washington is that unit-costs of production can be held to 1941 levels by the expected increase in number of units to be manufactured. And those who are spokesmen for this idea frequently state that it can be done without a business going into the red.

Right there is the point where businessmen and Washington economists begin to differ. For business is done for profits, not merely to break even. If there is no incentive of real profits, it will be increasingly difficult to persuade men in management to undergo the grief and long hours of work that are necessary to make a business succeed. If business is to be relegated to swapping dollars by OPA edicts, there are thousands of men in a management capacity who will refuse to continue the heavy responsibilities, preferring to play more golf and to fish *ad. lib.* when it is impossible to collect even if you win. Management and capital balk, just like labor, when they are not paid enough.

On the other hand, the proponents of the rigid price controls have a considerable experience back of them. It seems to have been proved, at least to their own satisfaction during the war, that the increased wartime volume did permit satisfactory profits to industry even under price controls. Their idea is that it can be done again in the early postwar years under continued controls.

Yet the two instances are not wholly comparable. During the war, there was an unlimited demand from government for production with no sales effort. During the early postwar years, there is expected, in theory, a parallel unlimited demand from civilians.

Civilians cannot, however, "demand;" cannot pay the asked-for price today and recover later a part of their money by compulsory renegotiation; cannot even buy all they want today. In place of one omnipotent customer, there are now 140,000,000 impotent customers.

In the meantime, loud voices are crying that unless business succeeds in employing everybody who wants to work, government—the omnipotent customer—must provide jobs. Yet, while the shouting proceeds, it is very difficult to find competent men to fit the peacetime jobs that are already available, right now.

In a spirit of true cooperation, all thinking men wish that there would be less braying at the moon, less threats of dire things that will happen, and a more understanding attitude. It took more than four or five weeks to get industry converted to war work when the enemy was defeating us at every turn. Without such a stimulus, it will take considerably more than four or five weeks to reconvert, find materials, engage sales personnel and get industry started again on peace goods.

Shouting dire threats and forebodings at industrial management and striking industries right and left are not stimuli equivalent to a series of military defeats or a sunken fleet. A few words of encouragement, or even shrieks of silence, would be more effective just now. Labor must learn that the workers are not the only ones who refuse to work when payment is inadequate. There is this difference, however. When labor quits work, there is a big hoopla about a strike. Everybody knows it. But when capital quits work, when owners of money refuse to invest, nobody knows it for a long time.

If nothing else comes out of the labor-management conference but a joint realization that both groups must combine forces and work to a common goal, it will have been a worthy effort. As long as labor and management remain at odds, or cling to a rule-or-ruin policy, the economy of this country is in serious jeopardy. Common sense must govern both groups. We are all in the same boat.

L. V. Burton EDITOR

The Talk of the Industry

• NOW that we are getting a true picture of conditions in Japan and the Philippines under Jap rule, it is apparent to how great an extent the Nips deluded themselves. "Greater East Asia Co-poverty Sphere" is the correct term.

• SOME weeks back the inimitable Crosby Gaige telephoned us this "poem" which he composed on the occasion of Henry Morgenthau's departure from the U. S. Treasury:

Tears, Idle Tears
(Or, It Pays to be Thrifty)

I wept so much o'er Madam Perkins
The family stored my tears in firkins.
And, goody-goody, that is how
I had some left for Morgenthau.

• ARE Secretary of Agriculture Anderson and Price Administrator Bowles singing the same tune? Anderson has said, "If we wait until food supplies are so plentiful that demand weakens and retail prices are falling and then eliminate the subsidies, the whole burden of the price decline is likely to fall on farmers."

But Bowles has said that price ceilings must remain until food supplies are so plentiful that at least three months can elapse with prices continuously below the ceilings before the controls may be permanently removed.

Anderson wants to remove the subsidies now while prices are strong and let natural prices replace subsidized prices, figuring that there are enough plentiful non-subsidized foods around to hold down the cost of living. This would add a horrid new term to OPA's vocabulary — "price roll-up" — to those whose earlier concept of reality was "roll-back."

The Secretary of Agriculture is probably more nearly correct, but OPA Bowles is probably the better salesman.

• SECRETARY of the Treasury Vinson and Secretary of Agriculture Anderson ought to get together on the matter of inflated farm prices. One thinks that the farmers' financial position is better today than it ever was before. The other has been selling farm land at prices so far above any reasonable figure there can be no hope of profit from its crops. Must be the city slickers who are boosting the prices.

• ISN'T it about time to smack down the ears of our Russian friends? Anyone who has traveled extensively around the world during the past war knows all too well that the public expressions and private views of people in various lands are often strangely inconsistent. The world would like to be friendly with Russia and, in fact, has gone more than half way to demonstrate that friendliness. American attempts to confer the benefits of self-rule wherever it is possible, or our efforts to plan for world security—not merely security for ourselves—appear to be interpreted as a sign of weakness by our Russian ally.

Russia is the most nearly self-sufficient nation on earth. It is also the largest in area. Why it should apparently seek more territory, or the control of more territory, or go more than half-way to offset the friendly atmosphere of the recent London conference deserves critical examination. If it should develop that the Russian government is utilizing the technic of continual agitation and the stirring up strife, as is the technic of fellow travelers who happen to be citizens of the United States, then it is time that Stalin, Molotov and Co. were properly informed in unmistakable language that we are not having any!

• THOSE who predict that other nations will soon have U-235 in quantity and atomic bombs enough to wipe this peace-loving nation off the map are reminded that the DuPont company had approximately 10,000 subcontractors when it was entrusted with the construction of the Hanford Engineering Works where plutonium was manufactured. Scientists who indulge in dire predictions seem to overlook the difference between the discovery of a principle and its actual engineering into production.

Hors d'Oeuvres

• Safeway Stores, 'tis said, will go in for grade labeling — but it won't go too far. It's expected to combine grade with descriptive labeling, thereby keeping both feet firmly on the ground — one on each side of a controversial issue.

• *Japan wants to buy 551,000 tons of sugar from the United States. — Let 'em eat the grass skirts they scared people out of in Hawaii.*

• One pound of natural or process Cheddar cheese contains the equivalent of 4 qt. of milk in fat, 2-4/5 qt. in protein, 3-1/5 qt. in calcium and 3 qt. in phosphorous, and is a good source of vitamins A and G. Hardly rat food, that.

• *It's "better to light a candle than to curse the dark." So says Dr. Russell M. Wilder in defense of what Dr. F. V. McCollum calls "a half-baked and wholly inadequate bread-enrichment program." Anyway, the controversy is well nourished.*

• A national better-meat-type-chicken contest is to be sponsored by A & P. How about a jet-propelled job without wings?

• *"Chosen to be Frozen for the American Housewife." With that slogan, Ultima Frozen Foods Corp. will glamorize its line of frosted foods. It's the Park Avenue version of "can't be beaten for eatin'."*

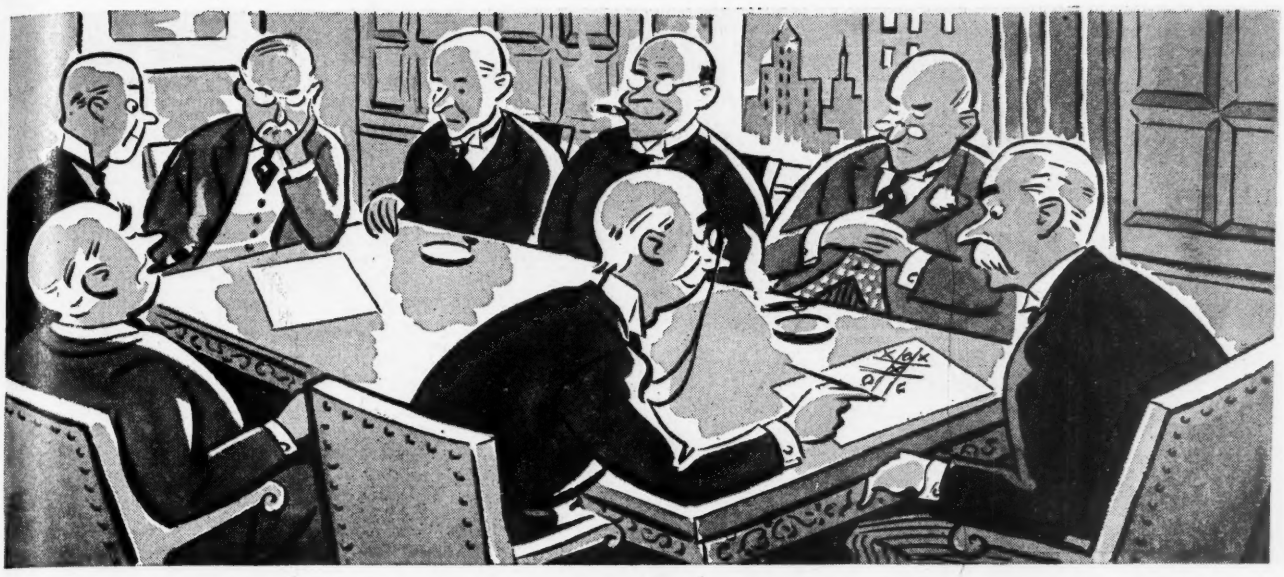
• Annual output of glass containers increased from 53,391,000 in 1940 to an estimated 104,000,000 in 1945. Here's at least one business trend that's easily seen through.

• *Blatz Brewing Co. will build a conveyor-tunnel to connect its plant in Milwaukee with a railroad siding. So a cost advantage long held by Schlitz will be Blatzed.*

• Kraft has entered the true-story field with "The Romance of Cheese." And therein is an interesting legend. Back about 2,000 B.C. an itinerant Asian merchant traveled all day over the hot desert, carrying goat's milk in a sheep's-stomach canteen. When the merchant drank from his canteen that evening, not goat's milk, but a thin watery fluid, poured forth. And inside the container was the world's first cheese curd, produced by the action of rennin in the sheep's stomach.

• *Better than a billion bushels of wheat will grow this season, crop estimates indicate. But without shortening and sugar, wheat is just so much pig feed.*

F. K. L.



Organizational stagnation has set in.

IS YOUR ORGANIZATION STAGNATING?

Satisfaction—a feeling of having arrived, and finally becoming lethargic—leads to organizational stagnation. Perpetually dynamic leadership is the corrective, even when this means younger blood

By D. Y. NAMIC*

ORGANIZATIONAL stagnation is the gradual easing-off on the part of top executives—those same executives whose mental keenness, alertness, vision and aptitude provided the stimulating leadership that produced a successful enterprise. These men furnished the pattern and set the goals that lead to accomplishment. Their own energy, during their active years, was the very life-blood of the organization. The danger begins when they reach the point where they no longer have the mental strength and energy to inspire and to lead their staff. It is here that conscious recognition of the actual condition is so difficult and that the cancer of decay starts.

In the life cycle of every long-lived industrial enterprise, there are periodic ocurrences when a new generation of managers should take over the reins. This period of transition, if treated with indecision, is extremely critical in industrial corporate life.

Innumerable examples in our industrial history indicate that the seeds of stagnation are first sprouted in this period, and the growth of organizational stagnation gets under way. Failure to recognize this evil and to apply corrective measures lead inevitably to business misfortunes and provide the opportunity for new enterprising organizations to rise and succeed.

An enterprise automatically changes from the offense to the defense when leadership slackens. The situation can be likened to football. Defensive tactics will never win the game. Similarly, no war was ever won by defensive action alone. And yet this well-known principle is quite frequently violated, usually unconsciously, by the very industrial leaders who have achieved an outstanding record of sucess.

In perspective, it seems that the men who have devoted themselves unstintingly to the difficult task of attaining success under the American system of competitive enterprise are more than likely to reach the point where they are satisfied with their accomplishments. It is here that they say, subconsciously:

"Our goals are reached—why am I not deserving of an easier and more comfortable period for my remaining years. I've worked, built and given of my ability for years so, of course, I've earned the right to coast in these last years of my stay. We have good products, accepted and well known by the consumers, and all that is necesary is to hold the line and enjoy the profits so deservedly earned."

The result is plain. The subordinate executives and workers can see it plainly, but they cannot speak—much less take corrective action. The business passes from the offense to the defense. From its boss

(Turn to page 212)

*For obvious reasons, the author wishes to remain anonymous. But he has spent many years in the food industry in a responsible position — THE EDITORS.

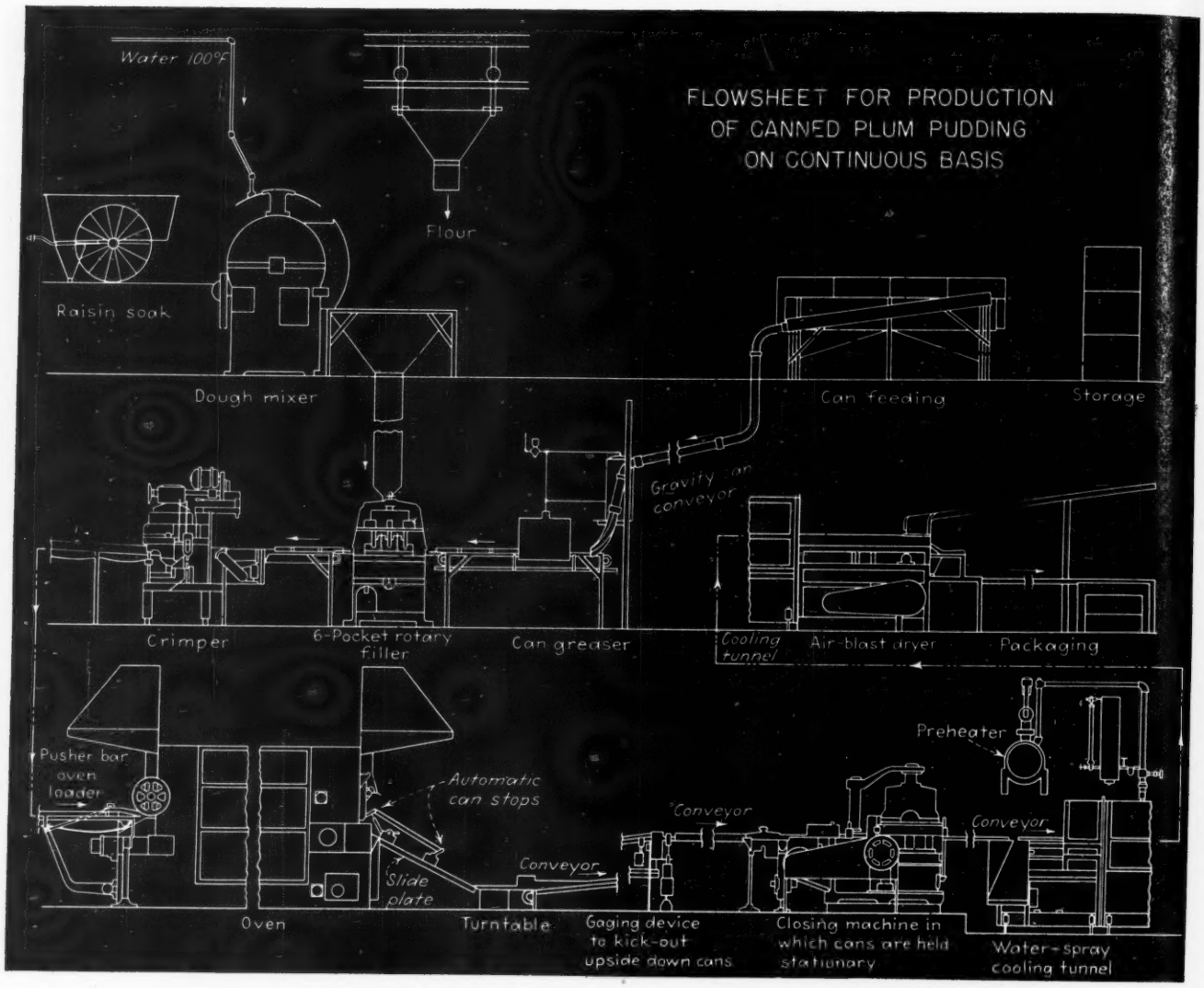


FIG. 1. Flowsheet for making and packaging of canned plum pudding by Kroger Grocery and Baking Co. in Cincinnati, Ohio.

Canned Plum Pudding Process Put on Continuous Basis

FROM a strictly mechanical viewpoint, processing a food for the armed forces calls for production volume that no salesmanager would —even in his most expansive imagination — consider necessary for a new item for a civilian market. From a composition viewpoint, foods processed for the armed forces must have a stability against deterioration during handling, storage and exposure to climatic changes far in excess of the stability needed for the same food for domestic markets.

In the making and packaging of plum pudding in camouflaged 300x 106 cans is found good examples of both types of technological problems and their solutions.

The volume of production required could not be achieved through existing facilities for steaming and further processing the pudding in the usual manner. So the first big objective was to find a satisfactory production method.

The attainment of that objective, in fact, involved solutions of two major problems. One had to do with the availability of equipment by which the production operations and the processing might be carried out. The second involved modification of an existing formula or the working out of a new one which could be handled on existing equipment.

A preliminary survey of available production equipment revealed the availability of a 10x75-ft. gas-fired, flat-bed, traveling oven, a 1200-lb. capacity horizontal dough mixer with a beater-arm agitator, and a 6-pocket rotary filler in the Cincinnati bakery of our company. The result was the maping out of a development and production program based on the use of this equipment.

Manufacture of a specialty has been converted to a mass-production operation. It was done by mechanizing all operations and establishing close tolerances. It's significance is as broad as the principles. Here are the how's and why's.

By WALTER REIMAN and N. H. VOLLE,
Kroger Grocery & Baking Co., Cincinnati, Ohio.

with the traveling oven as the keystone unit. Both the composition of the pudding and the coordination of these units had to be worked out in a way that would permit machine handling and automatic operation because of the large number of small units to be handled in a working day.

Developing a Formula

With the general performance of the equipment in mind, the first step was to work out the composition of a pudding which might be heat-treated (baked) in the oven. The necessary operations consisted of: (1) mixing the batter, (2) filling it into cans in the usual manner, (3) clinching covers on the cans loosely to permit ready escape of vapors and gases during baking (but sufficiently tight to be mechanically secure on cans), (4) conveying the cans through the heated oven, (5) hermetic sealing of the cans, (6) water cooling of cans and contents, (7) air-drying of can surfaces, and (8) packing into shipping containers.

In an attempt to make a pudding which would meet Q.M.C. specifications and could be handled on the available equipment, the first batters made were both baked in the oven and steamed and processed in the customary manner. Although the batters were of the same composition, that which was baked was only moderately moist and certainly too dry in appearance to pass for a steamed plum pudding. However, the actual moisture content of the steamed pudding was only moderately higher than that of the one baked in the oven — not enough greater to account for the marked difference in appearance. Mechanically, the method of handling the batter through the oven seemed to be satisfactory. The question was "How to increase the apparent moisture content of the baked batter and improve the appearance of the finished pudding?" The obvious solution was to make the necessary changes in the formula and the processing procedure.

The most effective change in those details was to increase the percentage of water soaked up by the raisins and to reduce that added as such to the batter. Other helpful changes were the replacement of brown sugar by invert sugar and molasses, a reduction in percentage of cracker crumbs used, and an increase in percentage of whole eggs.

These changes resulted in a pudding which apparently was more moist than any previously obtained, although its actual moisture content was practically the same. While the apparent moisture level reached was satisfactory, it was not as great as that in the steamed pudding. Also these changes gave a more fluid batter than was previously obtained. This fluidity caused some trouble, because the batter expanded out of the can during baking or expanded into the seam, plugged it and caused the can to blow up to release the excessive gas pressure created. These difficulties were remedied to some extent by very careful adjustment of the filling weight to 3⅜-3½ oz. of batter and closer control of the baking temperature. Discontinuing the use of the leavening agent also proved very helpful in eliminating "exploding" of the cans. The pH of the batter was maintained at its previous level, through the use of sodium citrate or disodium phosphate so as to insure proper browning.

FIG. 2. All ingredient creaming and blending operations are done in a standard beater-arm bakery mixer which tilts mechanically to deliver batter into a filler feed-hopper.

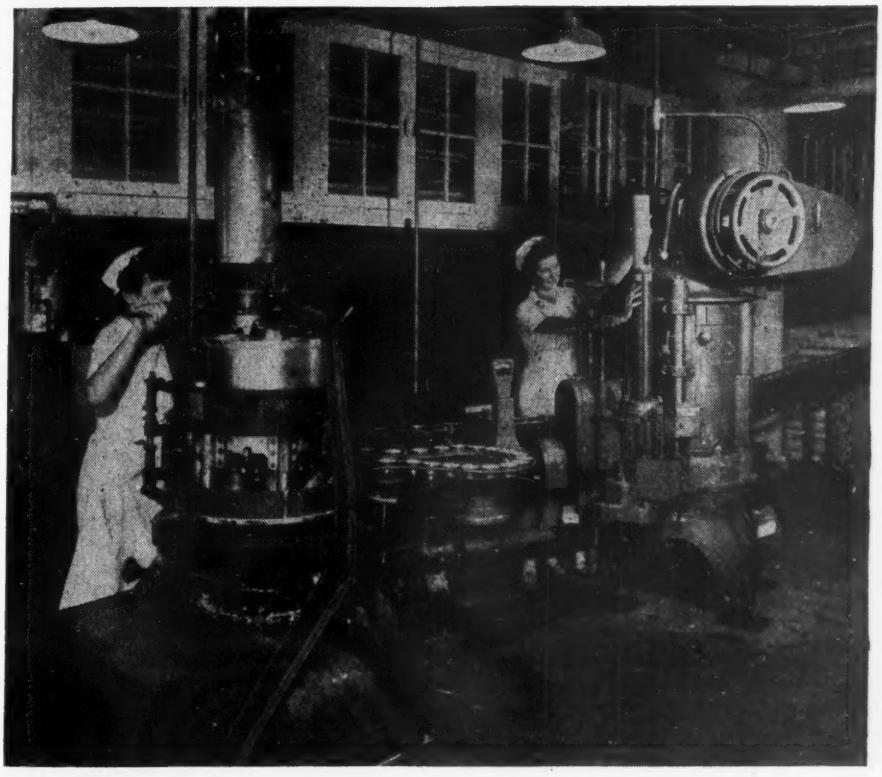


FIG. 3. From the feed-hopper the batter is volumetrically delivered into 3-oz. capacity cans by a 6-pocket rotary filler, covered by loosely crimped-on lids, and conveyed to a bakery oven on a flat surface endless chain belt.

In the early stages of the development work, puddings were baked in bright metal cans, cans lacquered on the outside only and cans lacquered on the outside and enameled inside. The effect of radiation from the outside surface of the can on baking time and baking temperature was impressively demonstrated in these tests. The baking time for puddings made in the bright metal cans was considerably greater than that for puddings baked in the other types. From the standpoint of baking, the puddings made in cans lacquered on the outside with a plain tin inside seemed to be the most satisfactory and at the same time conformed to the Army's policy of lacquering the exterior of cans for the dual purpose of camouflaging and protecting against corrosion.

The final formula developed during the experimental work is given in Table I. In brief, the shop operations based on this formula are as follows.

The shortening, invert sugar, skim milk, molasses, cracker crumbs and whole eggs are creamed together in the mixer. The salt, spices and flour are mixed together dry and added to the mixer alternately with the water—first dry ingredients then water until both are incorporated. After these ingredients are thoroughly blended, the fruit is added, and the blending continued until the finished batter is thoroughly mixed.

Prepared in this manner, the batter has a consistency which permits mechanical filling of 3⅛ oz. into the No. 300x106, open-top style cans coated with the regular Army olive-drab lacquer or enamel, clinching of lids loosely on the cans, and transfer to oven where it is heated at 325 deg. F. for 40 minutes.

After baking, the lids are double-seam sealed and the cans water-cooled.

The following analytical characteristics are representative of plum pudding made in this manner.

Moisture	38.4 percent
Protein	4.3 percent
pH	4.7 percent

When thoroughly cooled, the cans show a vacuum of 17 to 22 in. of mercury.

Some Precautions

Formulation of the plum pudding involved precautions which must be exercised in making the batter to insure satisfactory results. As the formula indicates, the batter may be considered as being prepared by a two-stage method. In the first or creaming stage, the shortening is creamed with the milk powder and several of the other materials. In the second stage, the flour, soaked raisins and other materials are incorporated into the creamed mass. With 100-hour shortening, proper creaming is necessary to prevent a badly curdled final batter. A badly curdled batter results in poor filling, wide filling-weight variations, separation in the batter and a mediocre plum pudding.

Since the filler used is a volume type, the specific volume of the batter has to be maintained uniform within the batch and from batch to batch to insure proper filling weights. Likewise, the specific volume of the batter is an important factor in the final appearance of the plum pudding.

Also, the rôle played by the raisins, which comprise 35 percent of the formula, cannot be overlooked. At this high percentage, the water absorption of the raisins is important in maintaining proper consistency of the batter and proper moisture content in the finished pudding. Since the quantity of dry raisins soaked per batch is considerable, the soaking is carried out in trucks for a specified time with definite temperature controls on the soak water. Further control is obtained by checking absorption of each truck load of soaked raisins by weighing on a push-on suspended floor scale after the soaking period.

The Production Problem

To this extent, the formula development work was complete. The equipment and production lineup consisted of the traveling oven, the dough mixer, and the filler, which had formed the original nucleus on which the formula adaptation was premised. That was only one phase of the big objective. Ways and means of large-scale production were yet to be worked out. No knowledge as to production personnel requirements, production layout, production controls, or production capacities was available. It was necessary therefore, for management to make production plans based on the knowledge and data submitted by the development laboratory and obtained during its formula and procedure development work.

TABLE I—Composition of Plum Pudding for U.S. Armed Forces

Ingredient	Percent of composition
Shortening (100 hr. for Army ration)	5.00
Invert sugar	8.10
Frozen whole eggs	1.10
Water added as such	14.50
Dried skim milk (roller)	5.10
Flour	9.40
Disodium phosphate	0.50
Spice	0.64
Cracker crumbs	1.30
Midget seedless raisins (before soaking)	35.00
Candied fruit peel	4.10
Salt	0.50
Molasses	2.30
Water soaked up by raisins	12.46
Total by weight	100.00

To arrive at a decision on a production program, conferences were held to obtain the views and recommendations of the plant manager, the production manager, the development laboratory men, the plant superintendent, the bakery superintendent, the plant engineer, and the head of the production control laboratory. Each member presented his ideas from his particular viewpoint and helped make possible the eventual evolution of the production layout flowsheet shown in Fig. 1.

Transition from the development laboratory production to large-scale production was not without its difficulties. In the laboratory, the batches were small in size. The batters were immediately hand-filled into a few cans which had previously been hand-greased, and were properly tamped down. The can lids were hand crimped and the pudding was baked in a small standard-size kitchen oven. By contrast, large-scale production requires mixing of batches in excess of 1,000 lb. per batch, filling with a standard filling machine, conveying the filled cans to a closing machine for a loose clinching operation and into a traveling oven. In the bakery a continuous filling and baking operation calls for a floor-time tolerance up to an hour. Hand-crimping allowed ample breathing space for escape of gasses and vapors, while machine-crimping has to be very accurately adjusted to avoid a tight seating of the cover on the can and subsequent blow-ups.

However, both phases of the development work were carried on intensively. And in about three months from the time the problem was first assigned to the research and development group, the manufacturing department was ready to produce canned plum pudding at a high production rate.

Too much credit cannot be given the engineering department for its part in bringing the equipment to a maximum degree of mechanization with variances reduced to a minimum. From the flowsheet and photographic illustrations (Figs. 1-7) can be seen the nature and extent of this mechanization.

Operations—Step by Step

To evaluate fully the effectiveness of this mechanization, one has only to begin with the empty can, follow the pudding through the various

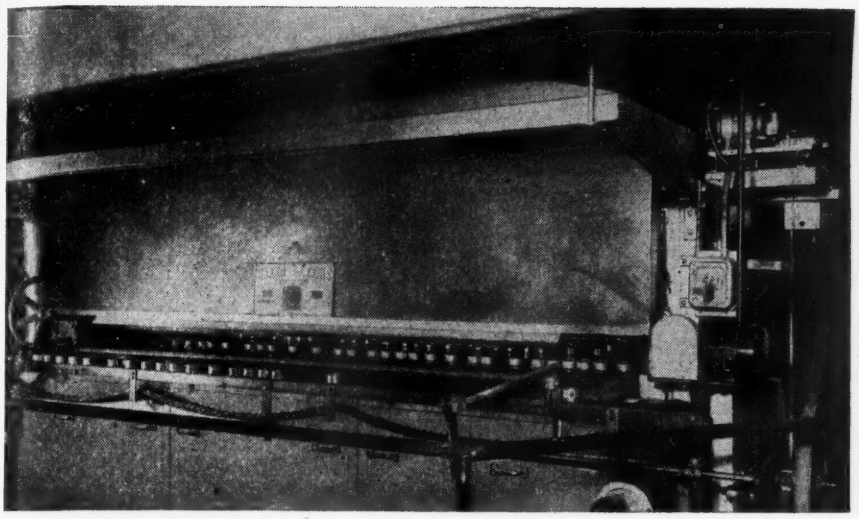


FIG. 4. By means of a pusher arm the loosely lidded cans are automatically loaded into a 10x75-ft., gas-fired, flat-bed, traveling oven.

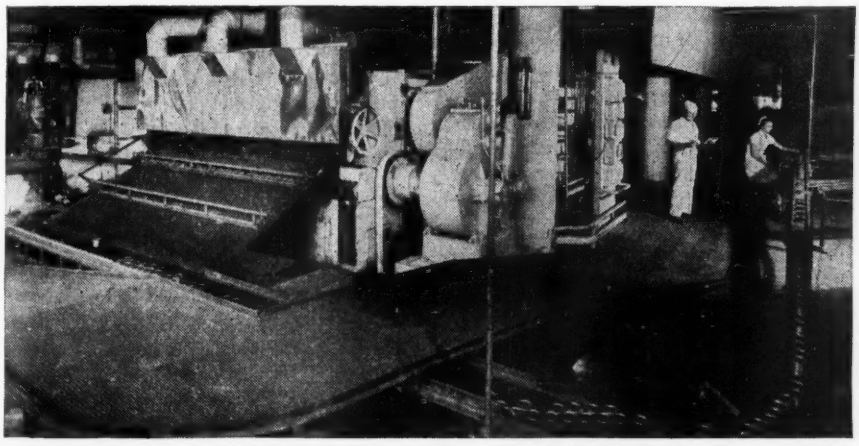


FIG. 5. At delivery end of oven, the hot cans are discharged onto an endless belt conveyor for delivery to the double-seam closing machine. Impact of 24-in. fall is broken by automatic stops.

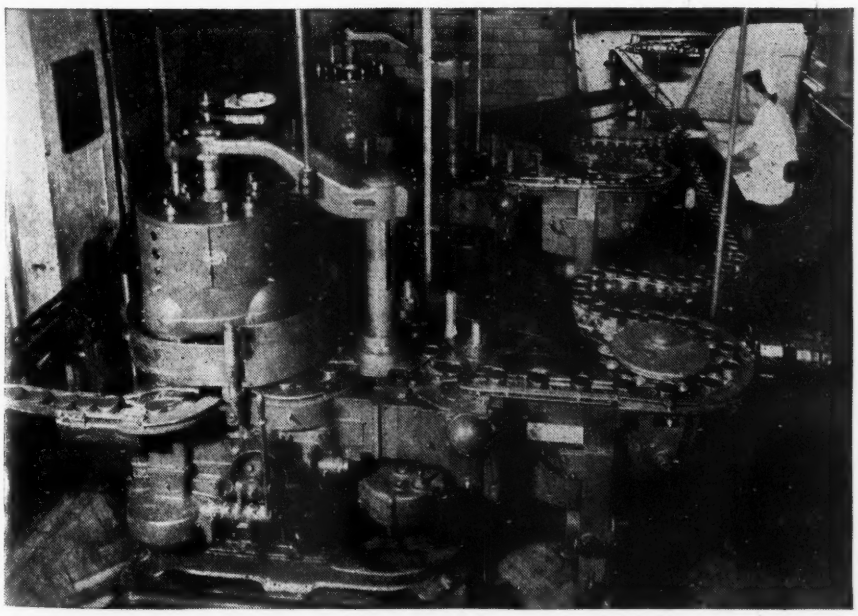


FIG. 6. In course of travel to double seamers, the cans pass between a guide and a microgage which activates an automatic thrust to kick out all inverted cans, which are righted by closer attendant.

operations, take into account the problems encountered and observe the methods employed in solving them.

As the cans move by gravity toward the filler, they are first cleaned by a b ast of filtered dry air. Then each can is turned right side up while passing through a twister preparatory to passing through an automatic greaser. The greaser consists of an atomizer sprayer connected to a supply of shortening and a source of air. Spraying is continuous, and the air and fat jet is adjusted to deliver the shortening properly to a continuous line of cans moving at the speed of the filller.

Preliminary production tests showed a relatively narrow limit of fill necessary to give a pudding of the desired quality. To obtain a finished pudding weight of 3 oz., a minimum of filling weight of 3¼ oz. of batter was found necessary. Batter weights in excess of 3⅜ oz. resulted in a certain percentage of cans blowing up in the oven because the clinched lid was sealed by the excess batter.

The 6-pocket rotary filler was found to do this job satisfactorily, although a proper head of batter in the filler hopper was found necessary to maintain accuracy. Even then, the batter peaked up in the can, causing fouling of the can covers and the crimping machinery. This condition often caused plugging of the vents between the can body and crimped lids, with a resultant number of blown cans. This peaking was corrected by applying appropriate extensions on the filler spouts to cause the batter to be spread evenly in the cans during filling.

Exploding Cans

As may be inferred from the foregoing statements, our original production test runs in the bakery oven gave us considerable loss because the batter-sealed cans exploded at the delivery end of the oven. This peaking effect was only one cause of this loss, which we learned after putting a spreading type of spout on the filler. Another source of trouble was the crimper.

In the can crimper, which is a standard closing machine modified to give a loose first-operation, the filled can spins rather rapidly, imparting considerable centrifugal force to the batter. In some instances, this force caused the batter to flow into the crimped area of contact between body and cover. When this flow takes place, the batter

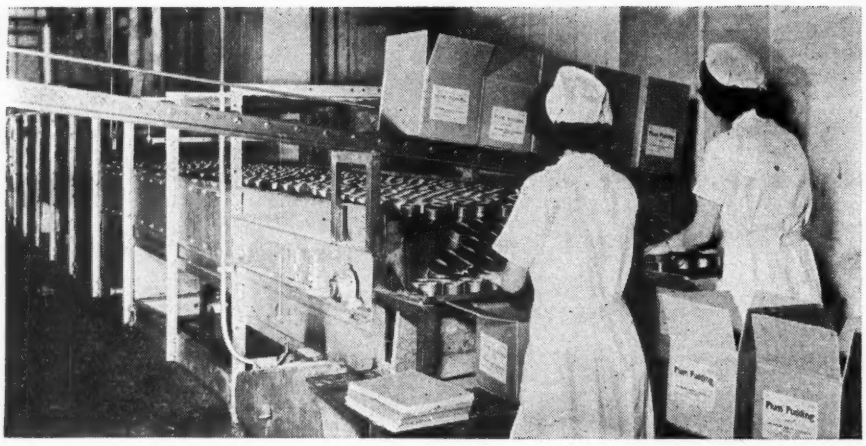


FIG. 7. Cooling and surface-drying of the sealed cans are done in a water-spray compartment and air-blast zone of a preserve-cooling unit. Filled shipping cartons are delivered to closing and sealing station by roller conveyors.

bakes in the space and seals the can. In all cases, the exploding or "blowing" of the cans resulted from the pressure of trapped steam generated in the oven. This difficulty was overcome by modifying the crimper machine to reduce materially the rotating speed of the filled can.

Following the cover-crimping operation, the cans are continuously conveyed to the oven in which they are loaded by a pusher bar synchronized with the speed of the oven to give a uniform spacing of the cans in the oven throughout the baking zone.

Baking Procedures

As has been indicated earlier, the baked plum pudding is inherently different from a steam-processed plum pudding in that it possesses a different physical appearance. A question we had to answer was: "How to obtain a similar appearance?" Thermocouple readings showed a maximum center temperature of about 220 deg. F. in the oven. At this temperature, little or no caramelization of sugars and dextrinization of starches take place. In contrast, conditions of processing at 240 deg. F. in the retort favor caramelization and dextrinization to a marked degree. Likewise, in steaming and processing there is little, if any, moisture loss in the process while, in the baking operations, shrinkage due to moisture loss is about 8 to 10 percent under best conditions. An obvious way to offset that moisture loss and to maintain as moist a product as possible, consistent with proper baking and good eating qualities, is the introduction of as much steam as is practicable at the feed end of the oven. That corrective step was not taken until tests showed that it is necessary to maintain the proper moisture content of the product even though the introduction of steam cuts the baking efficiency of the oven. Slow, long baking results in marked dehydration of the pudding, since oven temperatures had to be adjusted to lower the baking time to a minimum. A favorable factor in that adjustment is that the can is small and travels on the plate directly over the bottom burners of the oven. By maintaining a differential of about 100 deg. F. between the top and bottom temperatures of the oven, best results are obtained. The higher temperature of 450 deg. F. is maintained at the top of the oven to give an average oven temperature of 350 deg. F. and a baking time of 26 minutes.

Stops on the Drop

At the delivery end of the oven, a drop of about 24 in. to a conveyor belt about 6 in. from the floor was found necessary. In an effort to accomplish this drop with the least difficulty, a slide plate at a 45-deg. angle was installed to permit the cans to slide from the oven to a conveyor traveling at a right angle to the direction of travel of the oven. This slide plate had to be modified because the covers are only loosely crimped on the can and the impact at the backstop of the conveyor was found sufficient to spring the covers off many of the cans—particularly if the cans were subjected to any appreciable internal pressure.

This modification consisted of inserting two automatic stops in the path of the cans on the slide plate. Synchronized with the speed of the oven, these stops permit transfer of the cans from the oven in three easy stages to the conveyor, and loss due to springing of the covers was eliminated.

However, the introduction of the stops on the slide plate was not all gain. Another problem presented itself. Occasionally, a can turns upside down and travels in that position from the conveyor to the closing machine. This inverted position resulted in complete loss of the can contents and no little damage to the closing machine and conveyor equipment. In an initial attempt to overcome this difficulty, an operator was stationed at the conveyor to right inverted cans. But at the speed at which the cans moved over the conveyor, an occasional inverted can was not detected. In addition to the difficulty at the closing machine, a special inspection at the casing of the product was necessary to see that no such cans were packaged. Ultimate correction was made by placing a guide and microgage in the conveyor system immediately before the closing machine. Since the diameter differential between the bottom and top of the can at this point is approximately $\frac{1}{8}$ in., the microgage is set at $\frac{1}{32}$ in. more for the top than for the bottom diameter of the can. Fully effective, this device eliminates the difficulty. When an upside-down can moves through the microgage, it actuates a thrust which pushes the inverted can to a shunt track to be righted by the closing-machine operator.

Another Centrifugal Effect

Coincident with our discovery of the centrifugal effect of the crimping machine on the batter, we also checked the effect of the centrifugal force exerted on the baked plum pudding by the closing machine. We discovered that the rotary motion caused a breaking of the tender pudding and formed a hole in the center of the material. To correct this damage, closing machines in which the can is held stationary now are used.

From the closing machine, the cans are conveyed to the zoned cooling and drying tunnel. Cooling is done by a water spray in an enclosed compartment, excess water being removed by an air-blast dryer so that the cans emerge to the packaging and casing conveyor with relatively dry surfaces.

Whether the production of plum pudding in these small cans on a mass-production scale is continued under peacetime conditions or not, we feel that it gives an example of what can be accomplished — even under severe limitations of time — when research, production, engineering and technical control converge on a technological and production problem.

How Tartrates Are Recovered From Winery Wastes

By ZE'EV HALPERIN, Chief Chemist, Petri Wine Co., Escalon, Calif.

Part II—Recovery from grape pomace and wine stones explained. And the two key factors of this interesting byproduct-recovery operation—chemical principles and economics—are discussed. Tartrate uses are given

THE successful recovery of both tartrates and alcohol from grape pomace has been accomplished within the last three years by a method developed by Dr. E. Kurt Metzner, Los Angeles, who is largely responsible for the sound tartrate recovery programs of leading wineries in California.

In this process, as it comes from the fermenting room, the pomace is passed through a steaming operation during which the alcohol is evaporated and the alcoholic vapors are condensed and collected. After this dealcoholizing-steaming process, the pomace is discharged into a tartrate extractor where all tartrates are rendered soluble.

From the extractor, the pomace is conveyed through a hot water washing battery where it is washed free of any adhering tartrate solution by a counterflow principle. At the end of the washing battery, the pomace is subjected to a continuous pressing operation which removes the free water. It is then discharged to the pomace pile.

The hot water used for the extraction of tartrates is the cooling water coming from the alcohol condenser. At a given point in the tartrate extractor, the tartrate solution is withdrawn and pumped to the recovery plant, where tartrates are recovered much in the same manner as described for recovery from still slop. The entire operation is continuous, starting at the pomace conveyors.

Chemical Principles

Successful production of calcium tartrate from winery wastes depends upon supplying a correct amount of calcium to the material being treated, then attaining the correct pH by means of neutralizing the bitartrate with an alkali. The chemical action that takes place when $CaCl_2$ and CaO are added to a solution of cream of tartar in water can be presented thus:

$$2(KHC_4H_4O_6) + CaCl_2 + CaO + 8H_2O = 2(CaC_4H_4O_6 . 4H_2O) + 2KCl + H_2O$$

This reaction will occur at the neutral point of about pH 6.8 to 7.2. When dealing with winery waste materials, however, one is confronted with a very complex organic system containing, besides cream of tartar, many soluble organic and inorganic salts and organic acids, as well as proteins and pectins. All these have a tendency to affect the reaction by which calcium tartrate is formed. The isoelectric point of some of these substances is close to neutral, and when this point is approached, they will precipitate, with a resultant product of poor quality. Thus, by practice, it was found that the values of from 4.6 to 5.6 on the pH scale will usually cover most of the conditions encountered.

At a pH higher than 5.6, many undesirable materials will precipitate out with the calcium tartrate. When the precipitated material has settled out, the product has a "mushy" consistency and it is then difficult to wash the calcium tartrate free of such impurities. Much of the tartrate is lost in the washing operation, and the material is subject to the attack of several anaerobic thermophilic and some anaerobic mesophilic bacteria. These attack the calcium tartrate and can destroy the entire batch within a short time. They may also infect the precipitating tank and thus widen the scope of their destruction.

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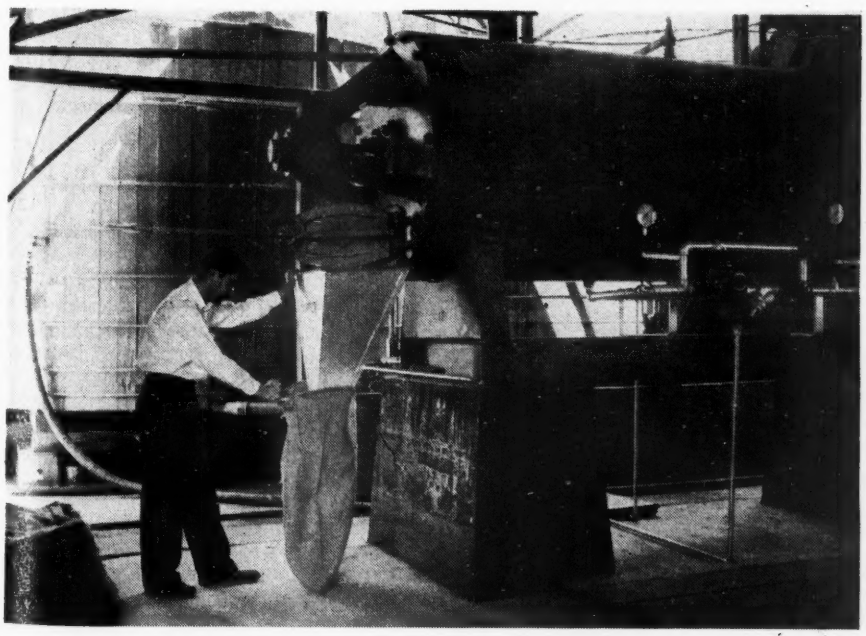
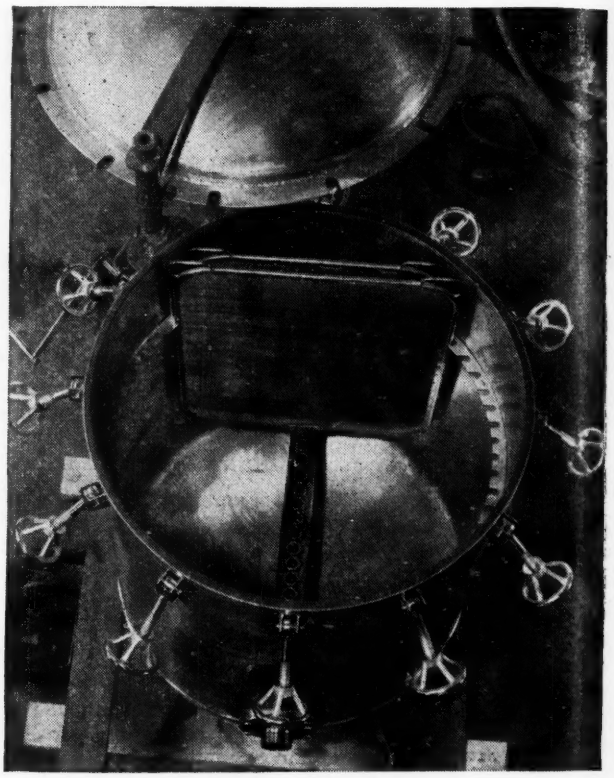


In this steam-jacketed dryer, which is provided with mixing paddles, the calcium tartrate is dried to a moisture content of less than 5 percent. From the dryer, the material is bagged for shipment.

Apple Juice Process Simplified And Speeded by Filtration



Interior of stainless steel Niagara filter, showing greater portion of leaves removed to illustrate sanitary construction. Filter-aid is deposited on metal cloth by juice and clarified juice flows to manifold pipe to which each leaf is connected.

Time-consuming enzyme method seriously curtailed production because of limited tank capacity. Installation of filtering equipment almost tripled plant output. Process is described step by step and illustrated by flowsheet

By DAN N. OHLHUES*, Manager
Macedon Foods, Inc., Macedon, N. Y.

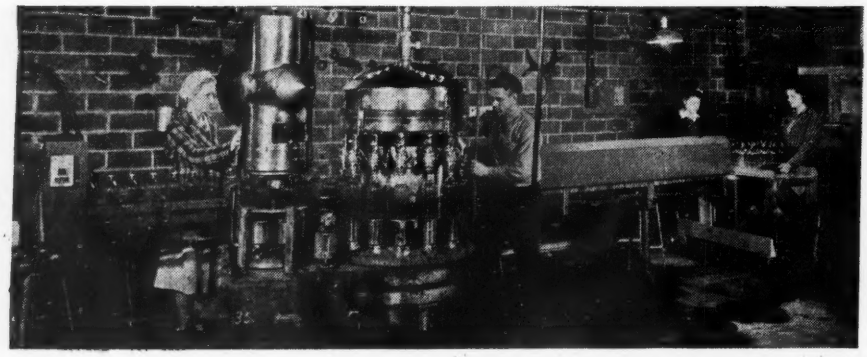
HIGH-QUALITY bottled apple juice may be produced by the simple method employing filtration and flash pasteurizing as the basic operations. Since adopting this process at Macedon Foods, Inc., production facilities have been streamlined and greater, more economical production has been the result.

The well-known enzyme method had been used in our plant. But with our limited tank capacity, production was curtailed seriously by that time-consuming method. And a fair percentage of our quality juice was being lost with the accumulated pulp and sludge resulting from decantation.

In adopting the new technic, it was only necesary to add filtration equipment. Once this was installed and our operators trained in filter performance, we immediately realized almost triple the production of apple juice that we obtained with our former process.

The complete process has been streamlined from raw-juice filling tanks to packaged cartons, as illustrated by the accompanying flowsheet. Juice from the presses (or from trucks or tank cars) is received in two 1,500-gal. stainless steel tanks in which are installed heating coils of sufficient area to raise the temperature of the juice to 130 deg. F. in 1 hour. The juice is then allowed to cool gradually, and the coagulated pulp rises to the top to be removed by skimming. This operation requires several hours. The juice is then pumped through a 4,000-gal. per minute flask pasteurizer, where it is heated to 175-180 deg. F. and held at that temperature for 3 minutes. After leaving the pasteurizer the juice flows through a continuous cooler and empties into a battery of supply tanks at a temperature of 100 deg. F. These tanks are equipped with cooling coils to keep the juice at low temperature while it is being held.

From the supply tanks the juice flows by gravity into a precoat tank where it is mixed with diatomaceous earth filter-aid. Clear juice is delivered by the filter to a 3,000-gal reserve tank, feeding the pasteurizer and filling machine. Passing through the pasteurizer, the juice is elevated quickly to 170 deg. F. in approximately three minutes and bottled.



Combination Mojonnier stainless filler and capper operating at the rate of 60 pints per minute. Finished bottles are packed in corrugated containers.

*In collaboration with E. A. Ulrich, Technical Director, Niagara Filter Corp. Since writing this article, the author has become president of Champion Container Corp., Le Roy, N. Y.

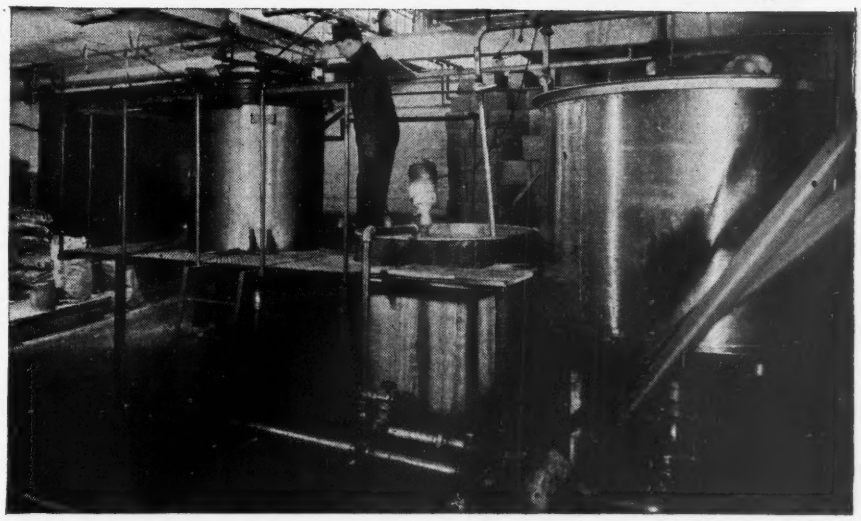
Juice enters the bowl of the filler directly from the pasteurizer. After leaving the filling machine, the bottles are closed with a standard crown cap. Then the containers are conveyed into a cooling tank, tipping on their sides as they enter the tank. After cooling, the bottles of juice are stood up on a conveyor belt for inspection and casing.

Filtering Operation

The filter employed is a pressure unit having 200 sq. ft. of area in all-metal filter leaves with metal filter cloth. The complete filter station is of stainless steel throughout, as are the tanks, pasteurizer, filler and capper.

At the beginning of a filter run, the juice is circulated through the filter and back to the filter-mix tank until the juice reaches satisfactory clarity. This takes three to five minutes, after which the clarified juice is directed to the clear juice storage tank.

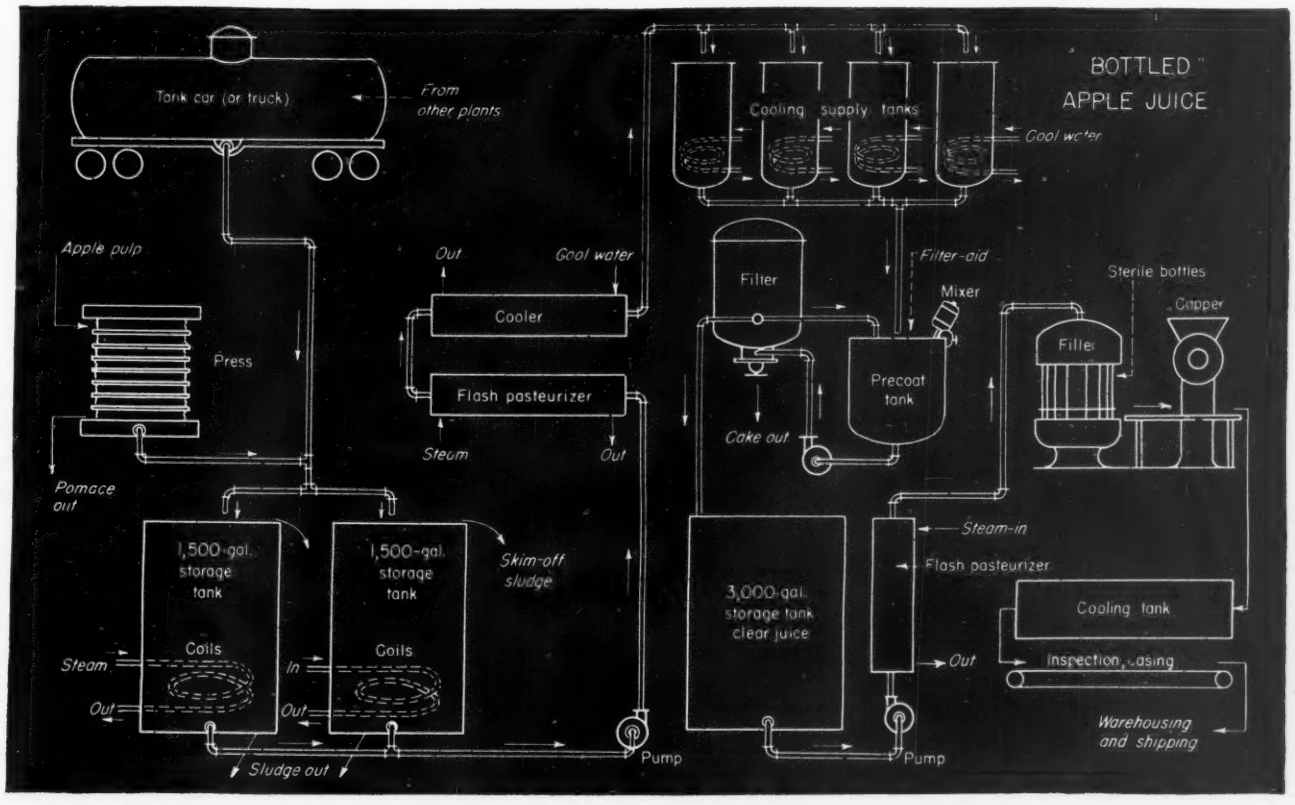
With proper filter-aid additions, the filter will produce approximately 3,000 gal. per operating cycle (season average), but due to circumstances in this plant 1,500 to 2,000 gal. is considered sufficient for processing. The capacity of the pump supplying the filter permits completion of this quantity of juice in a 1- to 2-hour period. The average use of filter-aid (of a medium-fine grade) ranges from 3 to 10 lb. per 100 gal. of pressed juice. The amount of filter-aid required is dictated by the grade or variety of apples pressed.



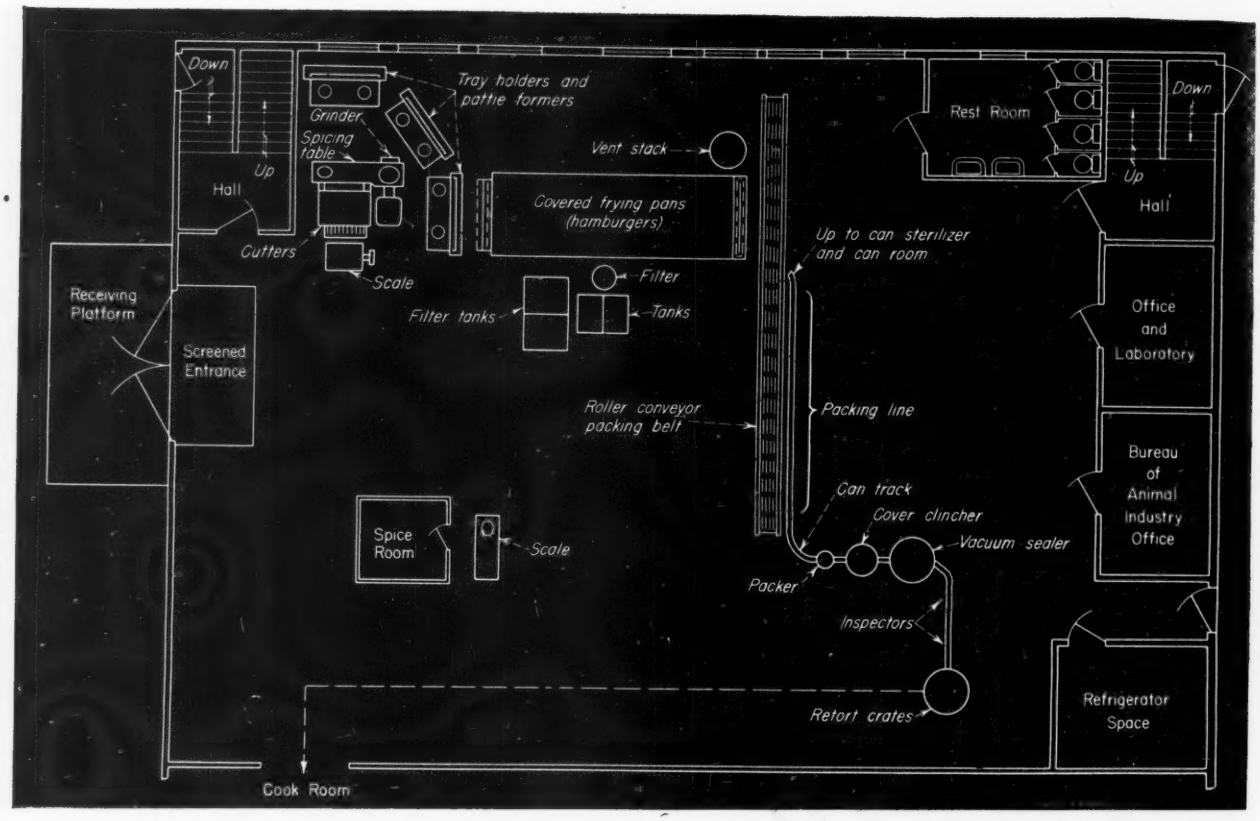
Filter station. From left to right is a filter, a precoat and mix tank, and an unfiltered-juice storage tank. At completion of a filter run, unfiltered juice remaining in the filter is returned to the mix tank by gravity.

Because the final product is packed in white-glass container, clarity of the juice is important. On the average, the clarity of our filtered juice is almost perfect, a very slight haze being characteristic of the product. The juice is very stable to changes in temperature, does not deposit a sediment, maintains its "eye appeal" and has remarkable shelf life. Cloudy juice has resulted where old peels, cores, or frozen apples have been used. Only apples in prime condition are recommended as suitable for a packaged juice of this type, not only from the standpoint of appearance but in respect to flavor.

Cleanliness throughout the plant is an absolute necessity in protecting the quality of the product. The hydraulic press cloths and press are overhauled and thoroughly cleaned every night, and every step in the process is rigidly inspected for sanitation on periodic checks.



Flowsheet of simplified process for producing clarified bottled apple juice.



Layout of canned-hamburger plant to make 12,000 hamburgers per hour, showing location of grinding, pattie-forming, frying, packing, can-closing and retorting equipment.

HOW TO MAKE

By CAPT. W. W. BAILEY

Q.M.C. Subsistence Research and Development Laboratory, Chicago, Ill.

Illustrations in this article are from Lake Odessa Canning Co.

IN developing a canned hamburger which has the flavor, texture and good eating qualities of one made from fresh meat, all forms of previously canned meat products and processing methods had to be discarded. This statement holds in spite of the more than 50 different canned meat products developed during World War II.

In addition to the effect of mechanical treatment upon the texture and flavor of the meat, process time and temperature are important factors in the changes which take place. Yet, this heat treatment is essential in obtaining a degree of sterility which gives stability in composition to the meat under varying and punishing atmospheric and weather conditions.

An attempt had been made to develop a satisfactory meat pattie canned in gravy, but it lacked the flavor possessed only by meat that has been in contact with a hot surface in the presence of hot fat. Also, the Army needed a canned hamburger that would come out of the can free from all sauce and gravy and could be eaten either hot or cold. How to obtain such a hamburger involved the solution of a product problem and of a production-method problem.

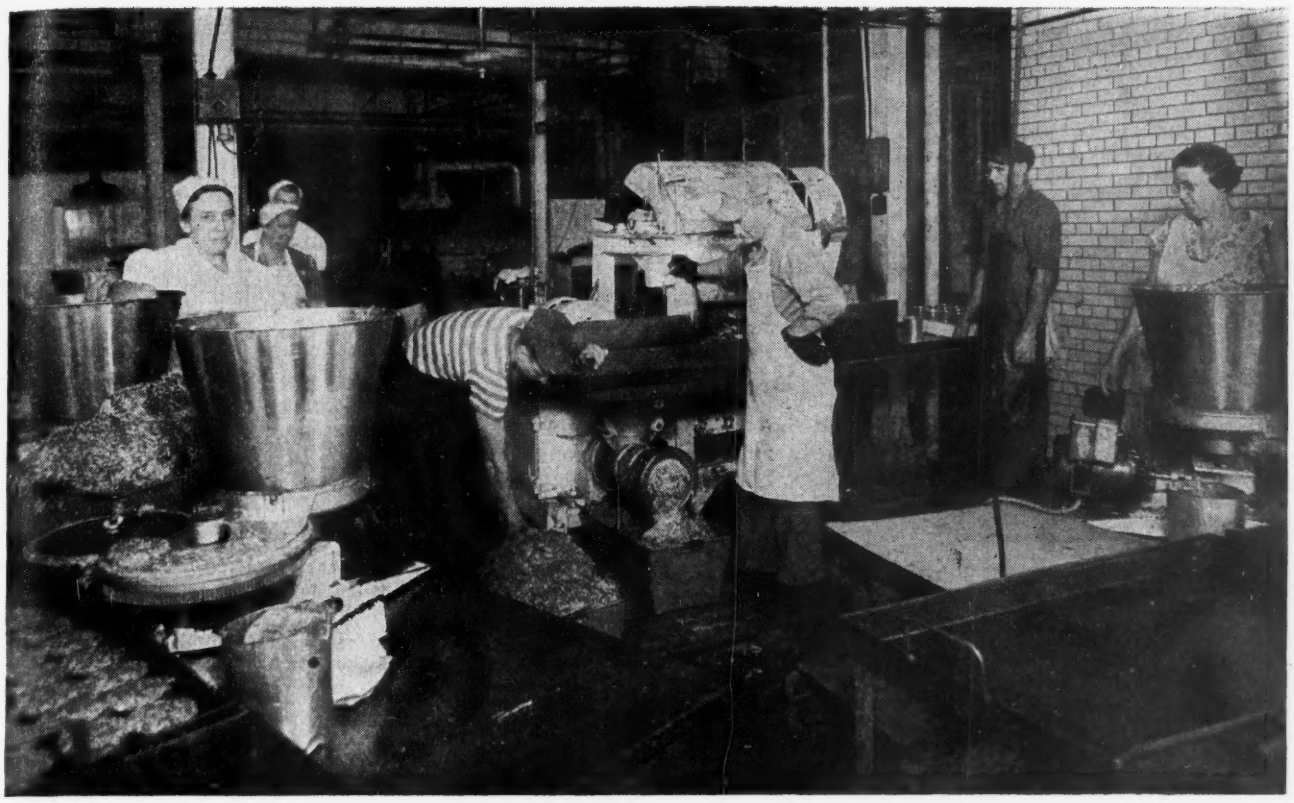
After several months of research, a method of frying in deep fat and packing under vacuum gave a highly satisfactory hamburger.

Solution of the product and the method problems gave rise to the engineering problem of how to lay out and equip a plant which would make and pack these hamburgers on a mass-production scale. Peacetime making of hamburgers was done by small concerns, and in most instances the hamburgers were formed by hand or by a semimanual device. Such devices do not lend themselves to large-scale operation.

A first step in the solution of the engineering problem was the development of a fully automatic pattie-forming machine which has a capacity of 50 to 60 hamburgers per minute. The second step was the working out of a method and a means of cooking the hamburgers.

Because of the large amount of moisture present in the meat and the low temperature at which it enters the heated fat, all deep-fat frying equipment formerly used for cooking doughnuts, potato chips, fried noodles and similar foods was found to be unsatisfactory for frying hamburgers. Solution of this cooking problem involved supplying heat to the fat in a manner that would compensate for the rapid B.t.u. loss due to excessive evaporation of the water content and the cooling effect of the refrigerated meat.

The significance of the solutions to the foregoing outlined problems upon the quality and uniformity of the finished hamburgers can best be emphasized by a detailed step-by-step description of the procedure followed in a typical, well-arranged and equipped plant. Both the raw mate-



Beef used carries 15 to 20 percent trimmable fat. It is "stripped" and mixed with pepper and salt seasoning preparatory to grinding through a ⅜-in. cutter.

CANNED HAMBURGERS

Positive control over materials, and engineered process technics and equipment, have converted a lunch-counter specialty to a volume-production nonperishable food item. Plant layout is shown, steps in process illustrated

rials and the equipment used play important roles.

Selection of Material

From the standpoint of raw materials used, canned hamburgers, as is true for other processed foods, must be made from correctly selected ingredients.

Beef carrying 15 to 20 percent trimmable fat gives most satisfactory results. Boneless beef from utility-grade carcasses usually carries about the right amount of fat. When boneless beef of lower grades —such as canner and cutter—has to be used, enough fat must be added at the time of grinding to make up the difference betwee.. the percentage of fat carried on the beef and the quantity necessary to make a total of 15 to 20 percent.

Number 1 kidney fat has been satisfactory, but cod and udder fats from good-quality carcasses have given the best results. The connective tissue in cod and udder fats helps to retain more fat in the finished hamburger than does that in kidney fat. This higher retention, in turn, produces a hamburger with a more tender texture than is obtained when kidney fat is used. During periods of short supply of beef fats, use of pork fat has been necessary. Back-fat from good-quality pork carcasses gives fully as good results as cod or udder beef fat if used not in excess of 5 percent. If too much pork fat is used, the finished hamburger has a pork flavor.

The technically correct percentage of fat that should be in the raw meat would be the minimum that would result in the frying-fat content of the deep-fat cooker neither gaining nor shrinking in volume. In practice, however, a small amount of excess fat is added to the raw meat so that the finished hamburger will have the desired flavor and be as tender in texture as possible. This excess results in a continual build-up of the fat in the cooker.

Meat Is Tempered

Tempering of the meat to approximately 40 to 45 deg. F. before chopping is necessary to obtain maximum performance of the forming machine and to make a hamburger with the desired texture. Unless the meat when chopped is above the temperature at which ice crystals are present, it will pack during the pattie-forming operation and require unnecessary pressure to force it through the forming machine. This packing results in a hamburger

which is too firm and compact in texture to have good eating qualities, and it puts excess mechanical strain on the forming machine.

On the other hand, meat at a temperature higher than 50 deg. F. tends to smear when forced through the forming machine and to give a high percentage of defective patties. In this instance, the texture of the hamburgers is adversely affected because at warm temperatures the meat particles tend to mush together. Imperfectly formed patties are objectionable because of the dificulty in getting the desired weight in the cans. For these reasons, meat temperatures outside the range of 40 to 45 deg. F. are avoided.

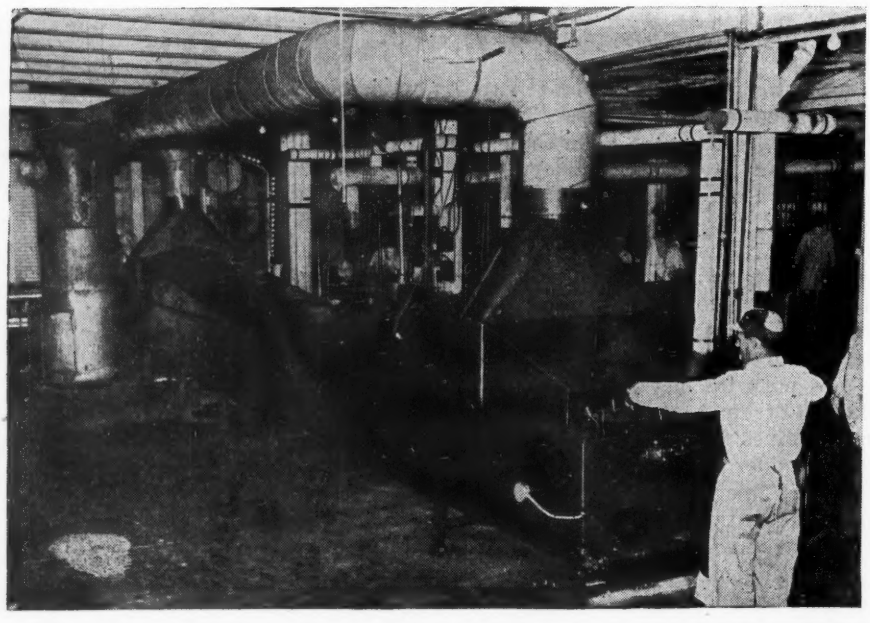
Making the Patties

Preliminary to forming into patties, the beef (and fat, if added), is put through a meat stripper while at the tempered temperature. The stripper consists essentially of circular knives mounted on a horizontal shaft and operating above a slotted horizontal feed table. As the meat falls on the table below the stripper, pepper and salt only are added for seasoning and are thoroughly mixed with the meat. Then the mixture is put through a conventional meat grinder (fitted with a $\frac{3}{8}$-in perforated plate) and transferred directly to the pattie former with the minimum of handling. The meat must not be mechanically mixed after grinding. If it is, it loses all of the natural loose texture of freshly ground meat and takes on the texture and appearance of canned luncheon meat—which definitely is not an acceptable texture for canned hamburgers.

The forming machine consists of a hopper with a horizontal screw which feeds the meat to vertical cylinders bored in a revolving plate that functions both as a forming mechanism and as a circular conveyor. Each cylinder is fitted from below with cam-operated piston and piston rod. As the piston rod passes over the cam, the pattie formed in the cylinder under the force of the screw feed is pushed to the top of the revolving head. The thickness of the pattie is determined by the adjustment of the piston in the cylinder to bring the face of the piston flush with the face of the revolving head as the piston rod passes over the cam.

When the piston is in the discharge position, the pattie is removed from the top of the revolving head by a circular spatula rotating in the direction opposite from, but parallel to and in intimate contact with, the top of the revolving head. Four of these pattie-forming machines are used in a plant making 200,000 hamburgers in a 16-hour work day. Two additional machines are advisable for standby so that a maximum production schedule can be maintained.

Without further mixing, the ground and seasoned meat is mechanically formed into patties 3¼ in. in diameter and ¾ in. thick and placed in perforated metal trays or shallow baskets preparatory to deep-fat frying.



Patties are submerged for 3½ minutes during passage on conveyor through 330- to 350-deg.-F. cooking fat in a 34x5-ft. steam-coil-heated vat to obtain the desired degree of cook and shrinkage in size.

Deep-fat Frying

Preparatory to deep-fat frying, the patties are manually removed from the revolving spatula and placed directly into flat preforated metal trays similar to placing biscuit doughs in a baking pan. These loaded trays are carried on an endless conveyor to and through the deep-fat fryer.

The frying unit consists of a rectangular metal vat, 5 ft. wide and 34 ft. long, equipped with a power-driven conveyor which carries the trays of hamburgers into and through the hot fat. Steam coils through which super-heated steam flows at 185 lb. per square inch pressure supply the necessary cooking heat to the fat.

Steam-coil heating was installed after direct-flame heating was found impracticable. Direct-flame heating was unsatisfactory because it gave

unequal cooking conditions throughout the vat. A factor that was particularly troublesome in obtaining uniform heating throughout the vat was the cooling effect of the incoming meat itself and of the rapid evaporation of the moisture from the patties during the early stage of cooking. When heat was supplied by direct flame and an attempt was made to keep the cooking temperatures uniform at all points in the vat, localized overheating conditions developed in the part of the vat nearest the flame. These conditions caused a breakdown in the cooking fat to such an extent that daily replacement of all cooking fat was necessary. Also, the hamburgers cooked under those conditions lacked a uniformity in quality and shrink. With the steam-coil method of heating, the temperature of the cooking fat was satisfactorily maintained between the desired 330 to 350 deg. F.

For the cooking fat, lard, blended fats and all hydrogenated vegetable shortenings were tried. Hydrogenated vegetable shortening with a 40-hour stability by the Swift active oxygen test is the fat used at present. There was a problem of fat breakdown until a continuous fat-filter was added to the production equipment.

Even when the patties are, to all practical standards, perfectly formed, various gelatinous and protein particles drop off into the hot fat as the perforated pans pass through the cooking vat. Much of this particle material burns on the coils and afterwards falls to the bottom of the vat. By means of a rotary pump, the hot fat containing these particles is continuously removed from the bottom of the vat, forced through an absorbent-earth filter and returned to the vat in a clarified condition during the cooking period.

At the end of each day's operation, the vat is emptied and the vat inner surfaces and the coils are cleaned thoroughly with hot water. No cleaning solution is necessary when continuous filtering of the hot fat during cooking is practiced. The fat removed during the cleaning operation is filtered before being returned to the vat from the temporary storage. Handled and treated in this manner, the fat can be used for 45 to 50 hours of continuous vat operation—which is more than twice the length of time possible before the continuous method of fat filtering was practiced. After the fat has been used 45 to 50 hours, it is sold as soap stock.

Because of the conditions under

Upon discharge from the deep-fat cooker, which operates under thermostatic and variable-speed control, the trays of hamburgers are drained of excess fat for 5 minutes to avoid a layer of fat in the packed can.

After draining free from excess surface fat, the hamburgers are packed two each into 6-oz. tinned cans and subjected to gentle pressure to make airtight sealing possible.

As a protection against rancidity development and to avoid can distortion, the filled cans are sealed under 20-in. vacuum. To prevent microbial spoilage, they are retorted for 60 minutes at 240 deg. F.

which canned hamburgers are likely to be used for making sandwiches—or even for eating, as such, out of hand—the presence of free moisture and rendered fat in the can is very objectionable. At the same time, the hamburgers should not be too dry, should have a tender texture and should appear appetizing. All of these conditions and properties are obtainable by controlling the temperature of the cooking fat, the length of time the meat is in the hot fat, and the amount of shrink given the patties. All three factors are intimately related.

Early tests showed that the patties would have to shrink 28 to 30 percent from raw weight during frying to avoid free moisture and fat in the packed can. This condition had to be kept constantly in mind when the production line and equipment were being engineered.

To obtain the maximum production volume from any given frying equipment, the patties have to be put through that equipment with the fat at as high a cooking temperature as the meat mixture will stand without burning the meat particles nearest to the outside of the pattie.

The desired 28 to 30 percent shrink is obtained when the patties have a thickness of ¾ in. and a diameter of 3¼ in., when they enter the hot fat at a meat temperature of 40 to 45 deg. F., and when they are cooked approximately 3½ minutes submerged in 350-deg. F. fat.

Since the term "trimmable fat" is largely a relative term applied to the quantity of fat present in the beef and does not take into account the fleck deposits of fat throughout the muscular tissue, it is in truth an estimation and to that extent is a variable. Also, since different parts of the beef carcass carry different amounts of trimmable fat, keeping the total fat content of each batch of meat exactly the same is impossible. The resulting variation in the fat content of the patties gives a variation in their moisture content. This practically unavoidable variation in the ratio of fat to lean tissue in the meat becomes a particularly important factor in the uniformity of the finished hamburger when it is combined with even a slight variation in the temperatures of the patties as they enter the cooking fat. Since absolute control cannot be exercised over this ratio of fat to lean tissue, precision control has to be maintained over the temperature and time of cooking the patties. By means of adjustable

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Electrical "Wear" In Motor Bearings

By D. B. HOOVER, Electrical Design Engineer
Westinghouse Electric Corp., East Pittsburgh, Pa.

Bearings in a motor or generator may be pitted badly by the action of electrical current flowing in the shaft of the machine. Here's why, and what to do about it

SHAFT CURRENTS in industrial motors and generators may cause excessive bearing wear and failure, the bearing becoming covered with fine pit marks.

Bearing currents may be either direct or alternating, depending on their cause. Magnetic dissymetry of a machine, due to manufacturing variations, will cause an alternating voltage to be generated in the shaft. This tends to circulate current through the shaft, across the bearing oil film, through the base and thence back through the other bearing.

Magnetization of the shaft may produce direct currents in the bearings. The method of connecting the series and commutating fields of a d.-c. machine may produce a magnetizing effect on the shaft if the load current is allowed to make an uncompensated turn around the shaft. But proper connection reduces the shaft magnetization to a small value. The flux set up by the magnetizing force generates a homopolar direct voltage in the shaft along the bearing. This voltage, if sufficiently large, causes direct currents to circulate locally from the shaft through the bearing and back to the shaft.

Alternating bearing currents may be eliminated best by insulating one bearing — including holding-down bolts, dowels, oil piping and grounded connections.

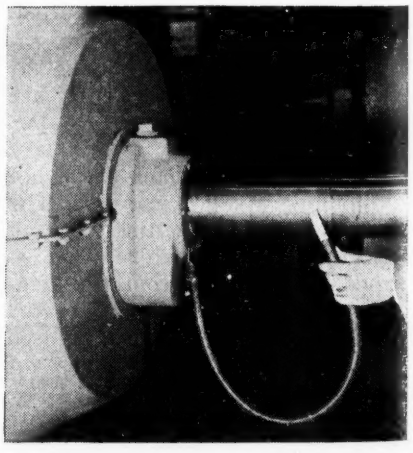
Direct bearing currents are most effectively eliminated by reducing the magnetizing force around the shaft, and it is recommended that the manufacturer of the machine be contacted. Bearing insulation will reduce the magnetic flux and the circulating bearing currents, this often eliminating bearing damage.

Both alternating and direct bearing currents may be reduced by shunting most of the current out of the bearing. This can be accomplished by adding brushholders (with low-resistance brushes that ride on the shaft) to the bearing pedestal or bracket.

Proper maintenance of oil and bearing conditions tends to eliminate wear caused by bearing currents, since a good clean oil film increases the resistance to current flow. Some machines are built with insulated bearings, and these should be checked periodically to make sure that they remain insulated.

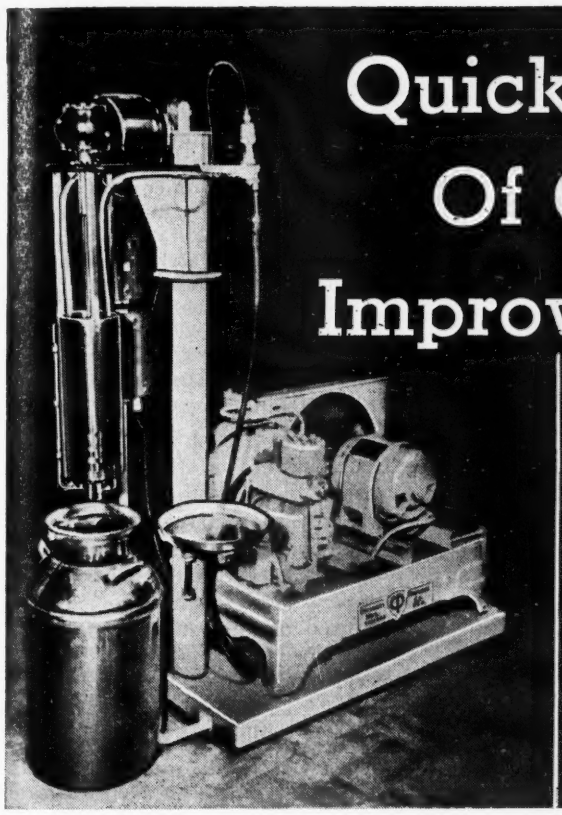
Roller or ball bearings are more likely to have bearing currents and abnormal heating than sleeve-type bearings, since the contact between the bearing and the shaft is extremely good. Also, the high-speed rollers or balls in the bearing will cut any flux passing from the shaft to the bearing at a high rate. This induces bearing currents within the balls or rollers themselves, causing overheating.

There have been a few cases of bearing currents caused by an external source, but external causes are very rare.

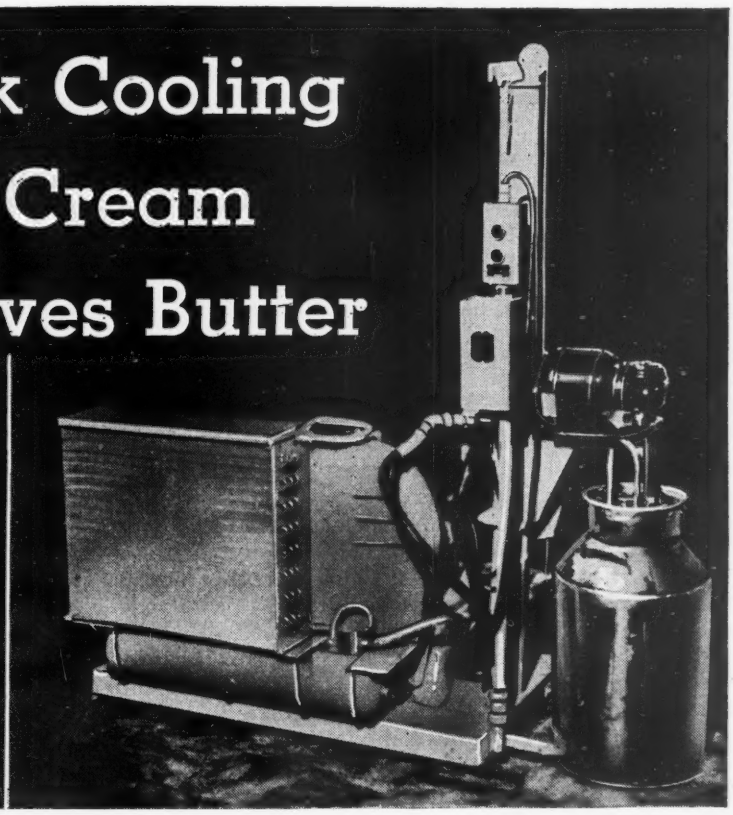


Persistent sparks between cable and shaft indicate possibility of bearing currents. The cable is fastened to the bearing housing.

Quick Cooling Of Cream Improves Butter



Erickson unit cooler, showing cooling cylinder ready to be lowered into can of cream.



Another view of the unit cooler, showing cooling cylinder in can ready for operation.

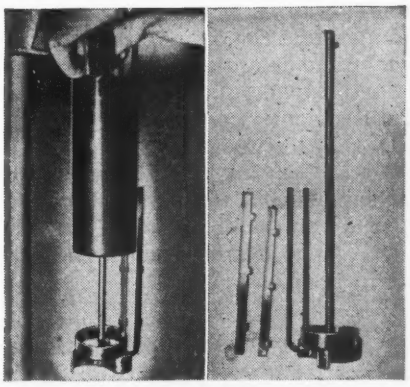
Lowering temperature of cream to below 55 deg. F. in 14 minutes gives quality improvement in bacterial content, acidity, flavor and texture. Principle applicable to sirups, flavorings, milk beverages and cultured milks

By JAMES S. ERICKSON and H. F. LONG
Research Laboratory, Sugar Creek Creamery Co., Danville, Ill.

PROMPT cooling of a fluid food material to retard bacterial and chemical deterioration and to improve the quality of the finished product has been done in a practical way by Sugar Creek Creamery Co. Although this method of improving quality has been applied to cream intended for butter making, the principle is applicable to other fluids. Among these other applications is the direct and rapid cooling of sirups and flavoring ingredients used in carbonated beverages, ice cream and milk drinks; of liquid milk on producing farms; of cultured milk for cheese making or for drinking; and of any liquid or semiviscous fluid in which bacterial growth or acidity development is a factor in quality deterioration.

The results obtained in this latest development in rapid cooling of fluids are quite similar to those obtained by the use of the so-called "shock-cooling" of poultry.[1] The temperature is lowered promptly and rapidly to retain the inherent good quality of the fluid, to check imediately the deteriorative effects of the unavoidable baterial content, and to make possible subsequent handling and processing with a minimum increase in bacterial and mold growths and in acid development.

As carried out at Sugar Creek Creamery Co., prompt and rapid cooling of cream is a result of the National Cream Quality Campaign conducted by the butter-making industry over the past ten to twelve years. A major problem encountered by those engaged in this quality campaign is that of cooling cream in warm weather at cream stations or collection points. The solution to the problem is complicated by the consistency of cream intended for butter making. Production of heavy cream, testing 30 to 40 percent fat, is encouraged for biological, physical and economic reasons. The high concentration of fat retards microbiological activity and temperature changes in cream during collection and handling. It also conserves shipping space and weight and makes possible retention of an increased



Left: Stainless steel agitator and scraper blades partially removed from cooling cylinder. Right: Agitator and scraper blades disassembled for cleaning.

[1] FOOD INDUSTRIES, February, 1945, p. 74; (Vol. 17, Vol. p. 130).

quantity of skim milk on the farm, where it has a high feed value for livestock.

Various methods and means for cooling cream at receiving stations prior to shipment to a central point for making into butter have been tried with varying degrees of effectiveness. Some of these methods, such as spraying cool water over the filled cans or covering the cans with wet burlap, do not reduce the cream temperature to any marked degree. In fact, they are makeshifts intended to prevent an increase in the temperature of the cream.

A more positive method of cooling has been tried by Sugar Creek Creamery Co. in some of its cream stations, with measurable beneficial results but with a too great time lag to give the desired results. This method consists of immersing the cans of cream in a commercial cabinet-type water-bath cooler in which the temperature of the water is maintained at the desired level by a thermostatically controlled refrigerating unit. Under laboratory supervision, test holdings were made to determine the length of time required to cool cream by this method. In each test, a number of filled cans of cream of known temperature were placed in the cooler and the contents of each were stirred every 15 minutes. The temperatures of the water and cream were taken at half-hour intervals. As indicated in Fig. 1, three hours was required to bring the temperature of the cream to a 50-deg. F. level. This time lag is presumably due to the fact that only a relatively small portion of the volume of the cream touched the can wall in contact with the chilled water, even when stirred regularly. Failure to obtain faster cooling in Trial 2, in which the average water temperature was lower than in Trial 1, is explained as the effect of a difference in fat content and body of the cream.

These rates of cooling undoubtedly would have been more rapid if the stirring had been continuous instead of intermittent. In practice, however, the station operators cannot be persuaded to stir the cream often enough even to obtain the cooling indicated in these trial holdings. Without stirring there is very little cooling, and the cabinet-type water-bath cooling becomes very little, if any, more effective than the water-spray or the wet-burlap methods. Another obstacle to successful use of this method is the frequent refusal of the operators to use the cooler because of the difficulty in lifting cans into and out of the cabinet. Installation of chain or rope hoists partially overcomes this objection, but the operation still remained time consuming and cumbersome. It was not unusual to find coolers which, though in excellent mechanical condition, were not used for extended periods because of the lifting required.

The chief virtue of these previously mentioned methods is that the general experience gained indicated the need for a type of cooler which would meet the following requirements:

1. It had to be adaptable for both unit and intermittent operation to fit into the present commercial practices.
2. It had to be easy to use so that station operators would actually cool cream with it.
3. It had to be simple in design, of sanitary and durable construction and fool-proof insofar as possible.
4. The cooling had to be positive and had to be completed rapidly to take care of the volume in certain stations. To accomplish this, mechanical stirring was a fundamental requisite.
5. The original cost and operating cost of the machine had to be low enough to permit its use from a financial standpoint.

The Answer

To meet these requirements, the Erickson unit cooler was developed. It consists of a standard 1-hp. compressor and a cooling unit mounted on a movable platform. The cooling unit consists of a double-walled stainless steel cylinder fitted with scraper blades and an agitator mounted on a post and capable of being lowered or raised to immerse or remove it from a can of cream. During the cooling operation, the cylinder walls are kept clean by scraper blades. Acting together, the blades and stainless steel agitator also circulate the cream and bring it into direct contact with the cylinder whose walls are cooled by direct expansion. These operations are powered by a ½-hp. gear-in-head motor mounted above the cylinder. The machine operates on a 110-volt current, is started manually, and shuts off automatically at the desired temperature.

To operate the unit cooler, a can is placed under the cylinder and the cylinder is lowered into it. The cooling begins when the machine is started and continues until the thermostat shuts it off at the desired temperature. When the cylinder is raised, a special switch permits the scraper blades to rotate slowly to remove excess cream from the cylinder and prevent dripping and waste. A pan can be swung under the cylinder to catch the drip of any of the material that is not removed by the scraper blades.

The effectiveness of this cooler has been tested by laboratory procedures. The material under test was warmed to 75-80 deg. F. and then cooled to approximately 50 deg. F., with recording of the time required and the temperature at various points in the cooling operation. A number of test holdings were made on cream of varying degrees of acidity and fat content to determine the cooling efficiency that can be expected under average conditions of operation. Results of some of the representative trials are shown in Fig. 2. In general, the

TABLE I — Results Obtained in Cooling Cream With Erickson Unit Cooler.

Can No.	Temperature received at station (deg. F.)	Acidity at station (percent)	Temperature after cooling (deg. F.)	Time cooled	Type of jacket	Temperature received at plant (deg. F.)	Acidity at plant (percent)	Time received at plant	Increase in acidity (percent)
				TRIAL 1					
1	78	0.70	Not cooled	—	None	78	0.90	8/2/44 8:30 a.m.	28.6
2	78	0.70	56	8/1/44 2:00 p.m.	Heavy	70	0.75	8/2/44 8:30 a.m.	7.1
These two cans were mixed at the receiving station. Average temperature for 24-hour period, 80 deg. F. Station room temperature, 88 deg. F.									
				TRIAL 2					
1	78	0.64	Not cooled	—	None	82	0.91	8/4/44 9:00 a.m.	42.2
2	78	0.65	60	8/3/44 2:30 p.m.	Heavy	74	0.75	8/4/44 9:00 a.m.	15.4
3	78	0.65	56	8/3/44 2:45 p.m.	Heavy	72	0.70	8/4/44 9:00 a.m.	7.7
All the same cream; was mixed at the receiving station. Average temperature for 24-hour period, 84.5 deg. F. Station room temperature at 2:30 p.m., 95 deg. F.									
				TRIAL 3					
1	72	0.60	Not cooled	—	None	74	0.70	8/9/44 7:45 a.m.	16.6
2	72	0.59	56	8/8/44 3:00 p.m.	Heavy	69	0.62	8/9/44 7:45 a.m.	5.1
3	72	0.59	55	8/8/44 3:15 p.m.	Heavy	68	0.60	8/9/44 7:45 a.m.	1.7
4	72	0.58	54	8/8/44 3:30 p.m.	Heavy	68	0.59	8/9/44 7:45 a.m.	1.7
All the same cream; was mixed at the receiving station. Average temperature for 24-hour period, 74 deg. F.									

cooling was most rapid at the high temperatures and decreased in rate as the temperature decreased. The approximate average cooling rate in all the trials was 2 deg. F. per minute in the range of 80 deg. F. down to 50 deg. F. The unit performed satisfactorily at all the temperatures in this range. With the heaviest cream tested (50 percent fat) no difficulty was experienced in cooling.

Several trials were made to compare the cooling efficiency obtained on cream with that obtained on water. Equal quantities of each were warmed to approximately the same temperature, and the unit was run until the cooling cylinder was thoroughly chilled before being lowered into either the cream or the water. The results of a representative trial are given in Fig. 3. This trial and others indicated that the unit cooler regularly cools cream slightly more rapidly than it cools water. These results appear to be further evidence that effective mixing of the cream and scraping of the cylinder walls are being obtained.

Effect on Quality

Various studies on the effect of cooling milk or cream immediately after production have been reported, and there is universal agreement on the benefits that result from this practice. If a product such as cream is cooled a considerable time after production (when a rather large increase in numbers of microorganisms has already occurred), the picture is somewhat similar and again, benefit should be expected. In each case, deterioration is largely prevented while the product remains cold. If the product is allowed to warm up during transportation and handling, maximum bacterial growth will not be expected to occur until the organisms have passed the "lag phase" in their growth.

Laboratory studies included the effect of the rate of cooling on bacterial growth and acidity development in cream. In each test, a batch of low-acid cream was divided into three portions. One was cooled rapidly (84 to 44 deg. F. in 6 minutes), one was cooled slowly (84 to 44 deg. F. in 2 hours) and one, uncooled, was held as a control. Representative portions of each lot were then held at 65 deg. F. and at 80 deg. F. At either holding temperature, all the trials showed the marked advantage of cooling as indicated by less bacterial growth and acidity development in the cooled samples. They further indicated that rapid cooling tended to retard bacterial growth and acidity development more than does slow cooling. While this difference was not a pronounced one, it did exist in all the trials made and emphasizes the superiority of rapid and positive cooling.

The value of the unit cooler in actual operation was studied by placing one of the coolers in a typical cream-receiving station during the hot summer months. It was used regularly by the station operator to cool each can of cream received. After cooling, the can was jacketed with a heavy canvas jacket to delay temperature changes. Generally, cream from this station was picked up about 9 p.m. by an unrefrigerated truck for transportation to the plant, where it arrived at approximately 9 a.m. the following day. Before being placed on the truck, jackets were removed from the jacketed cans. At intervals, tests were made to determine temperature and acidity changes in the cooled and uncooled cream. Some typical results obtained are given in Table I.

In Trial 1, the uncooled cream which arrived at the receiving station at 78 deg. F. with an acidity of 0.70 percent was received at the plant at the same temperature but with an increase in acidity of 0.20 percent. This represented a percentage increase over the original acidity value of 28.6. The same cream cooled to 56 deg. F., and jacketed with a heavy canvas jacket until

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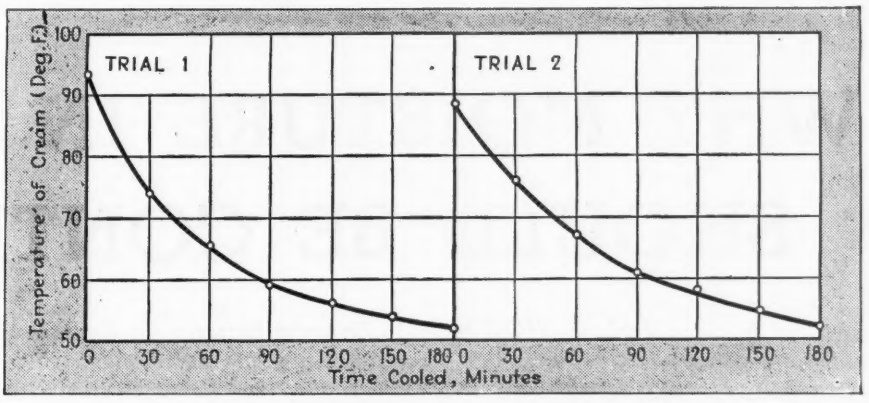


FIG. 1. Rate of cooling cream with cabinet-type water cooler, the cream being stirred every 15 minutes. The values represent an average of eight cans. In Trial 1, the average water temperature was 42.3 deg. F.; in Trial 2, 36.6 deg. In Trial 1 the average degrees cooled per minute was 0.23; in Trial 2, 0.20.

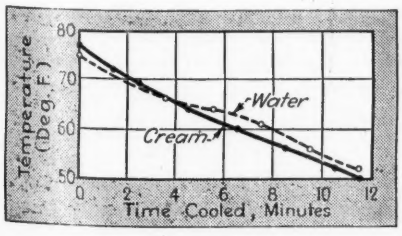


FIG. 3. Comparison of cooling efficiency on cream and water. Weight of water was 75 lb.; weight of cream, 75 lb.; percent of fat in cream, 33.5.

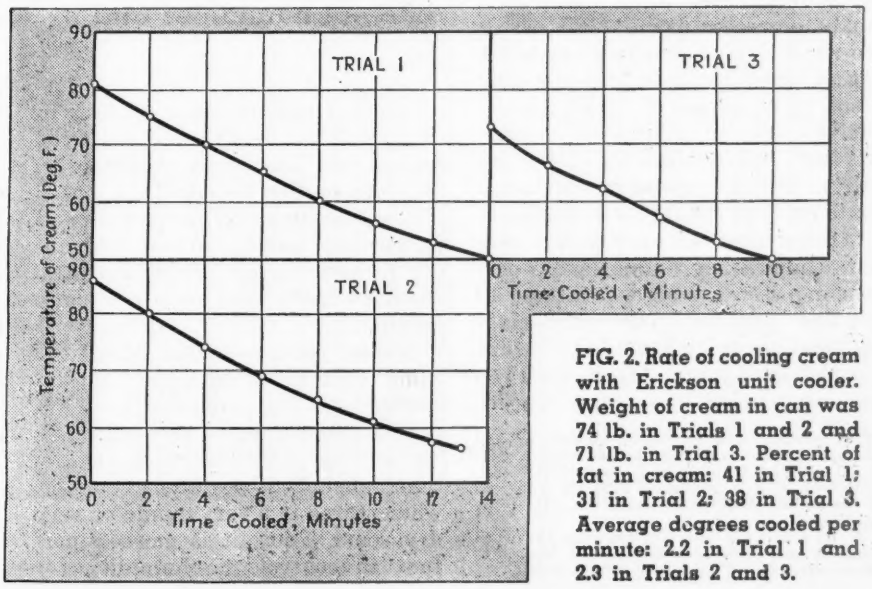
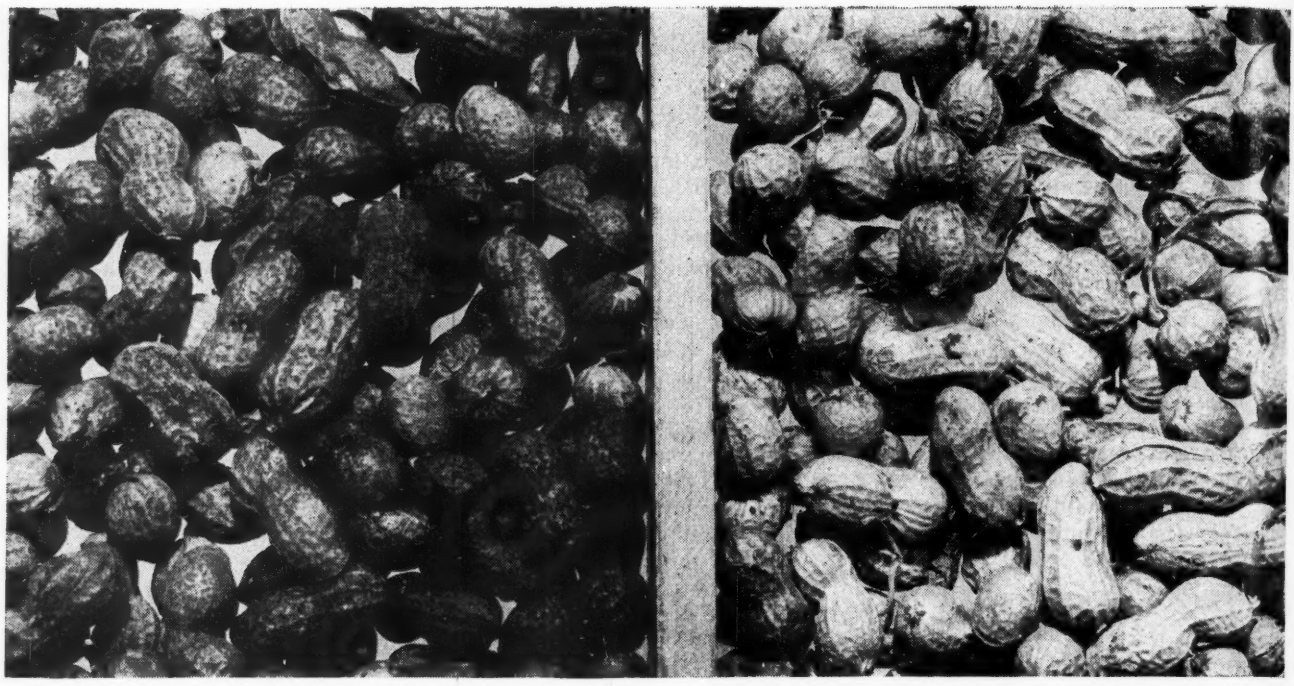


FIG. 2. Rate of cooling cream with Erickson unit cooler. Weight of cream in can was 74 lb. in Trials 1 and 2 and 71 lb. in Trial 3. Percent of fat in cream: 41 in Trial 1; 31 in Trial 2; 38 in Trial 3. Average degrees cooled per minute: 2.2 in Trial 1 and 2.3 in Trials 2 and 3.



Peanuts permitted to "weather" in the field or in warehouses, as were those at the left, often become discolored, moldy and rotten, resulting in off-flavors to salted peanuts, peanut candies and peanut butter. Such faulty peanuts yield almost as much oil as those in normal condition, but the refining loss may run as high as 20 percent.

WHY MOISTURE IN PEANUTS SHOULD BE CONTROLLED

By J. G. WOODROOF, Georgia Experiment Station, Experiment, Ga.*

If too high, moisture may cause more deterioration than rancidity or insect infestation. Here are results of experiments in curing, storing and processing peanuts, under different humidities and by varying methods

MAINTENANCE of the proper moisture content in peanuts and peanut products is very important. Insufficient drying of freshly harvested peanuts, or drying them too slowly, results in discolored, moldy, or rotten peanuts. Excess or too rapid drying on the other hand, causes them to be brittle and may result in an excess of "splits" while shelling. In all stages of curing, storing, and processing there are fairly definite optimum moisture contents that should be maintained.

At the time of harvesting, peanuts contain approximately 35 percent moisture, 30 percent oil and 19 percent protein. The immediate problem in curing them is to reduce the moisture content from about 35 percent to below 10 percent, in order to prevent molding and heating in storage. After being cured in stacks, picked and stored in warehouses, the composition should be about 5 percent moisture, 47 percent oil and 28 percent protein. When held under proper storage conditions little change should take place for many months.

Shelled peanuts contain about the same amount of moisture as unshelled peanuts, under the same humidity conditions. They will take up or lose moisture more rapidly than unshelled peanuts, however, when stored in a very humid or very dry room. Thus, it is more important to control the humidity for storing shelled peanuts than it is for unshelled.

Blanching reduces the moisture content to about 3 percent, but as blanched peanuts are seldom held for more than one or two days, without further processing, storage conditions for blanched peanuts need not be carefully considered. Blanched peanuts become rancid very rapidly when placed in storage.

Dry-roasting unshelled peanuts or oil-roasting shelled peanuts drives off all but a trace of the moisture, and for practical purposes freshly roasted peanuts are moisture free. However, they will absorb some moisture immediately, even while

*This project was sponsored jointly by the Georgia Agricultural Experiment Station, National Peanut Council and Tennessee Valley Authority, and is published with the approval of the station director as Paper No. 141, Journal Series.

S. R. Cecil and Helen Thompson furnished data on shelf life of peanuts, and Naomi C. Woodroff supplied data on curing peanuts.

cooling, and subsequent moisture content depends on the manner in which they are used, or on the conditions under which they are held. Those in the shell pick up moisture slowest, shelled unblanched peanuts absorb moisture much more rapidly, and those that are blanched and roasted absorb moisture so rapidly that special precautions must be taken to prevent serious losses in crispness.

Peanut butter is usually made from peanuts taken directly from the roasting ovens, and therefore should contain only a small amount of moisture. Candies containing roasted peanuts vary in moisture content from 1 to 7 percent, depending on the amount of moisture added with the ingredients. Hard candies, as peanut brittle, usually remain at about 2 percent, while fondant or other types of soft candies range as high as 7 percent.

Salted peanuts should contain less than 2 percent moisture to be of best quality, but if improperly packaged, or held in places where the air has more than 60 percent relative humidity, they pick up as much as 4 or even 6 percent moisture. When their moisture content rises above 3 percent they lose their luster and become clammy, soggy and unpalatable.

Whole or crushed roasted peanuts have been found excellent for homemade ice cream, provided the cream was used within two days. However, the peanuts were unsatisfactory for commercially made ice cream that was held for three days or more. This was because the peanuts absorbed moisture from the other ingredients and became soft, waterlogged and gummy.

The accompanying table gives the range in moisture content of the good quality peanuts and peanut products that usually appear on the market. Seldom are the moisture contents of products on sale lower than those given, but they often are much higher, and may be a chief cause of poor appearance, lack of crispiness and loss of palatability. This is especially true with roasted peanuts, salted peanuts and peanut candies.

The moisture content of shelled or unshelled raw peanuts should be stabilized at 3 to 6 percent, that for roasted peanuts at about 1 percent, hard candy at about 2 percent, and soft candies at about 5 percent.

Drying Time

Data were obtained on the rate of drying of freshly harvested peanuts in various kinds of stacks in the field, in the barn, with forced air circulation and in dehydraters. Moisture was reduced from 35 percent to 8 percent in eight hours by dehydration, in two weeks by forced ventilation in the barn, and in four weeks by stacking in the field. Peanuts in the upper third of the stacks dried about twice as fast as those in the lower third. Increasing the amount of exposure to the sun by piling in windrows of various kinds greatly increased the rate of drying, but this additional exposure to the ground sometimes prevented drying, and caused rotting on the bottom of the piles.

The texture of salted peanuts is being studied here by means of a tenderometer. Mercury flows from the burette into the flask, which sets on a plunger that crushes the peanut. The amount of mercury required is measured in the burette and "the grams to crush" is calculated. About 30 tests, requiring one to two minutes each, are run on each sample under examination.

Fair results were obtained by drying peanuts in the barn with air forced through the pile. Both the peanuts and the hay were of very high quality. However, the enormous space required rendered this method impracticable for drying peanuts.

Drying peanuts by dehydration was quite satisfactory in that those on the vine required nine hours, and those picked off the vines dried in six hours. The necessity of holding the temperature below 130° F. to prevent the development of off flavors seems to be the limiting factor.

Texture and Appearance

The effects of high moisture on the texture and appearance of 13 types of peanut products usually found on the market were studied. Each product has a rather definite optimum moisture content, which when exceeded by as little as 2 per cent usually means loss of desirable appearance and texture. The ill effects of high moisture on processed peanuts are so pronounced, and take place so rapidly, that in many cases they are paramount even to rancidity and insect infestation as a cause of spoilage. This is also true of peanut candies made with pea-

These are the humidity-controlled cabinets in which more than 130 peanut products were tested at the Georgia Experiment Station, where this article was prepared.

The quality of peanuts and peanut products begins in the fields and is greatly influenced by the temperature and humidity of the storage warehouse.

nuts exposed and of candies made with peanuts covered in sugar or other moisture-absorbing material. All candies and products containing sugar became soft, clammy, sticky and unacceptable when the moisture content exceeded 2 percent over the original. In time, mold developed on all the products containing 8 percent or more moisture. Salted peanuts cooked in fresh oil were crisp at a much wider moisture range than those cooked in used oil. This was due to the lack of crispness, originally present in the samples of peanuts cooked in used oil, so that the absorption of a very small amount of moisture seriously affected the texture.

Storage Life

Products stored at 80 percent relative humidity became rancid more rapidly than those at lower humidities, but rancidity progressed more slowly once it was initiated. In general, no product stored at 80 percent relative humidity remained good in texture and appearance long enough to develop serious oxidative rancidity, since rancidity development was chiefly affected by time and temperature, irrespective of relative humidity. At 80 percent relative humidity, raw shelled and unshelled peanuts and peanut flour remained good for about 30 days; blanched peanuts and peanut candy, with a hard coating around the peanuts, remained good for three to four weeks; salted peanuts and soft peanut candies were undesirable within two weeks because of rapid absorption of moisture.

At 65 percent relative humidity, peanuts did not become rancid as quickly as at 80 percent relative humidity, but once begun rancidity developed more rapidly. However, as compared with those stored at 50 percent relative humidity, rancidity appeared sooner but did not develop as rapidly. Raw peanuts, shelled and unshelled, remained good for from eight to twelve months at 65 percent relative humndity; blanched peanuts and peanut flour remained good in appearance and texture, but were objectionably rancid after 30 days; the hard peanut candies remained good for about three months; the salted peanuts and soft candies, as well as those with exposed peanuts, lost crispness and became rancid after four weeks.

At 50 percent relative humidity, rancidity did not appear as soon as at either 65 or 80 percent relative humidity, but its progress after initiation was more rapid than with either of the more humid atmospheres. There was no significant change in the texture or appearance of the products until after three months in storage, at which time the processed products began to appear whitish and lose attractiveness. The raw peanuts, both shelled and unshelled, were slightly rancid after twelve months; the hard candies were slightly rancid after three months; salted peanuts and soft candies were good for about two months; the blanched peanuts, peanut flour and salted peanuts cooked in used oil were rancid within four weeks.

The above mentioned variations in incidence and development of oxidative rancidity were very slight, although significant. The chief factors affecting oxidative rancidity are time and temperature. In these experiments the temperature remaind fairly constant at 70 to 80° F.

Moisture Content of Good Quality Peanuts and Peanut Products.

	Percent
Freshly dug peanuts	30-39
Cured peanuts in stacks	5-10
Unshelled peanuts in warehouse	4-5
Shelled peanuts in warehouse	4-5
Blanched peanuts	3.0-4.0
Peanut flour	4-5
Unshelled roasted peanuts	.5-1
Shelled, roasted, salted peanuts	.5-2
Peanut butter	.5-2.0
Peanut brittle	1.5-2.5
Peanut roll, peanuts exposed	5.5-6.5
Chocolate covered bar, fondant center with whole or crushed peanuts	4.0-5.0
Chocolate covered bar, crisp candy center with ground peanuts	1.0-2.0
Hard candy coat, peanut butter or ground peanuts in candy center	1.0-2.0
Peanuts individually coated with sugar, hard candy or chocolate	1.5-2.5

Summary

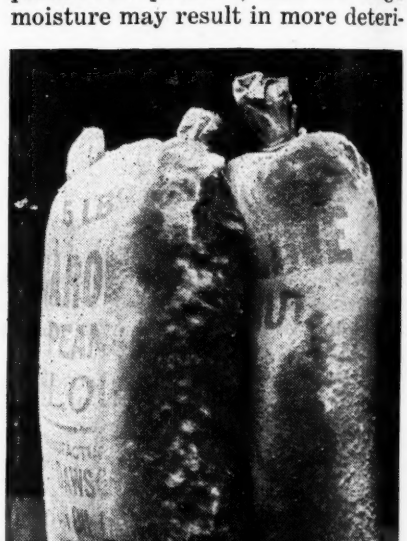
Control of the moisture content of peanuts and peanut products is a paramount problem, and too high moisture may result in more deterioration than rancidity or insect infestation.

Freshly harvested peanuts may be dehydrated in air circulating at about 400 ft. per minute, heated to 130 deg. F., in about six hours.

Storage rooms for peanuts and peanut products should have a relative humidity of about 60 percent.

The moisture content of cured peanuts should be held at about 5 percent, that for roasted peanuts at about 1.5 percent, for hard peanut candies at about 2 percent, for soft peanut candies about 5 percent, and peanut flour at 4 percent or lower.

Salted peanuts roasted in fresh oil were less subject to high moisture deterioration than those roasted in much-used oil.



Peanut flour molds readily when stored at above 60 percent relative humidity, even though held at 36 deg. F.

CARBON DIOXIDE IN THE FOOD INDUSTRY

PART IIIA—Uses of Solid CO_2—In distributing fish, fresh fruits and vegetables, and food containing fat, solid CO_2 is becoming increasingly important. The author tells why; gives chart to determine consumption

By GUSTAVE T. REICH, Consulting Engineer, Philadelphia, Pa.

COYNE[1] has reported that in the presence of carbon dioxide gas the period of preservation of white fish, either whole or filleted, is considerably extended. It is not suggested that after a prolonged period of gas storage the fish is as fresh as when caught, but only that the decomposition due to growth of bacteria is largely inhibited. Whereas fish packed in ice and kept in air is definitely sour and stale in about 12 to 14 days, that packed in ice and kept in an atmosphere of CO_2 shows no sign of sourness after a period of 28 days. Similarly, fillets of fish at 0 deg. C in carbon dioxide gas kept at least twice as long as in air.

Low-temperature trucks carrying a payload of two tons of frozen fish require 80 to 100 lb. of solid CO_2 for refrigeration, which is sufficient to maintain a temperature of 15 deg. F. for 24 hours. Unfrozen fish requires 15 to 25 percent less refrigerant, as a much higher temperature is maintained.

Distributors are providing boxes and cabinets which are refrigerated with 25 lb. of solid CO_2 per day for unfrozen fish and 45 lb. for frozen fish. Nonreturnable carton shipments of 10 to 20 lb. capacity require 3 to 4 lb. of solid CO_2, and they will not rise above 40 deg. F.

Oysters, lobsters, crabs and crabmeat refrigerated with solid CO_2 are shipped by airlines.

Fruits and Vegetables

While a carbon dioxide atmosphere is considered a good preservative, fruits and vegetables are very susceptible to the action of this gas, and careful studies should be made for the tolerance of the various food products. Indiscriminate use may cause serious damage. Experience shows that peas, carrots and sweet corn, held in a carbon dioxide atmosphere are much fresher and sweeter in taste than similar lots held at the same temperature in normal air. Peaches, strawberries or red raspberries, however, are apt to be adversely affected by this gas.[1,12] Nevertheless, raspberries and strawberries[15] have been shipped commercially under solid CO_2 refrigeration. If the berries are cooled to 58 deg. F. and a CO_2 concentration of 30 to 35 percent is maintained, no changes in flavor and luster are observed. Frozen fruits are not affected, and they can be handled similarly to ice cream.

In the Imperial Valley, where there are huge truck farms, the shippers refrigerate their railroad cars with water ice and solid carbon dioxide. The amount and kind of refrigerant required vary greatly. It is important to note that with some perishable foods a certain amount of relative humidity must be maintained. Furthermore, some have a higher respiration rate than others, thus liberating more heat by plant metabolism. Therefore, precooling and refrigeration with solid CO_2, or the combination of water ice and solid Co_2, are applied according to the specific food product.

Frozen Foods

Frozen foods hauled in large transport trucks do not require bunkers. The solid CO_2 is placed on the top of the load. It is advisable to keep the refrigerant separated by means of wooden racks and then cover the whole load with a canvas so as to take advantage of the gaseous refrigeration. For small shipments of as much as one ton, approximately 200 lb.—or 10 percent —of solid CO_2 is required per 24 hours. For shipments of two to three tons, 8 percent is needed, while 3- to 5-ton loads require 5 percent of solid CO_2 per 24 hours.

Miscellaneous Uses

The multiplicity of uses of carbon dioxide cannot be covered in such a short article. In the packing of

How meat is packed in boxes and barrels with CO_2 refrigerant.

products containing fat which is apt to become rancid, carbon dioxide acts as an antioxidant. This applies to coffee, nuts and shredded coconut.[13] Some coffee packers either put a small pellet of solid CO_2 into each cellophane bag or can just before filling, or they flow gas into the container. Automatic gasefying and canning machines are available on the market.

Bakeries in Holland cooled bread to minus 13 deg. F. by covering it with solid CO_2 in a closed container, thereby retaining all the characteristics of fresh bread for a long time.[2] New York cereal chemists were obtaining the same results with bread stored for a week. The freezing of bread by means of solid CO_2 may permit its shipment to distant points. Other experiments showed that with the addition of a small amount of finely ground solid CO_2 to the dough, a better texture product is obtained, as the dough is kept cool during the mixing.[14]

According to the modified "cold process" in South Africa,[3] the microorganisms contained in the freshly pressed grape juice are rendered completely inactive by dissolving 1.5 percent by weight of carbon dioxide in the liquid.

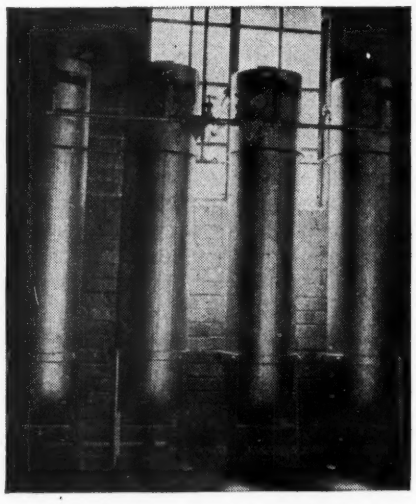
Boxes containing 60 lb. of butter can be refrigerated with 6 lb. of solid CO_2 for 48 hours.

Airlines find it very convenient to use solid CO_2 in the drawer of their food-tray cabinets to keep milk, cream, butter, salads and baby food fresh.

Food plants storing grain found that in the presence of an atmosphere of CO_2 the danger of combustion is eliminated, and that for fumigating the grain ethylene oxide or methyl bromide and solid CO_2 proved to be very effective.[5]

The largest use of carbon dioxide in gaseous form is in the production of carbonated beverages, in dispensing draught beer and soda fountain products, and so forth. A 50-lb. cylinder weighs approximately 110 lb., so transportation expense for the full and empty cylinder is almost four times that for the liquid content. Furthermore, the cylinders require valve repairs, painting and steaming, which increase the cost of the liquid CO_2. Therefore, many users of liquid CO_2 equipped their plants with several large cylinders having up to 10-ton capacity. Called "converters" these are built like the regular liquid cylinders, but they have a lid, to permit insertion of solid CO_2. This lid automatically seals immediately, because the solid CO_2 reverts to gas and then, under the pressure built up in the container, returns to liquid.

These converters are tested at 3,000 lb. of hydraulic pressure and provided with safety releases set at 1,500 lb. of pressure. They develop a working pressure of around 1,000 lb. The solid CO_2 charged into such container yields, of course, pound for pound of liquid CO_2. Also, owing to the saving in cylinders, freight,



Large cylinders, called converters, into which solid CO_2 is put to supply carbon dioxide gas in the user's plant.

etc., the cost of liquid obtained is less than in cylinders. In using these converters, the consumer must bear in mind that the air which entered during the charging must be removed in order to get a high carbonating efficiency. Finally, attention must be called to the fact that the users are obliged to provide adequate cleaning for these converters.

Looking Ahead

In order to assess future possibilities, the past growth of the solid carbon dioxide industry is a good criterion. In 1922, the author made solid carbon dioxide in ton lots to carry on experiments in refrigerating railroad cars and steamers, without obtaining encouragement from the shippers. In 1944, we had a production of 646,321,000 lb. of solid CO_2 and only 335,203,000 lb. of liquid CO_2. Up to a few years ago, 95 percent of the solid CO_2 was used in the ice cream industry, a few percent for the shipment of other perishable products, and the remainder mostly in the chemical industry. With the increased production, the percentage of use of solid CO_2 for refrigerating ice cream dropped to 81 percent,[7] 14 percent was used to refrigerate meat, poultry, fish, fruits and vegetables, and 5 percent was employed to refrigerate frozen foods and used in fire extinguishers and chemicals.

The increased use of solid CO_2, especially in the meat industry, points to a very promising future in this field. The great activity in quick freezing presents a great opportunity for solid carbon dioxide and distribution in clean, dry, nonreturnable containers. The meat industry has developed methods for the preparation of boneless meat. And compact, well-protected containers refrigerated with solid carbon dioxide—preventing shrinkage, retarding the influence of microorganisms, and preserving the meat in transit for days—must be considered an added asset to this industry.

The manufacturers of solid carbon dioxide and the refrigerating engineers will have to take advantage of the newer developments in insulating materials. These permit the use of lighter shipping containers and thus lower the cost of transportation. Also, better methods of distribution and application of scientific principles for the retardation of sublimation of solid carbon dioxide should be utilized. (Chart on facing page shows the effect on solid CO_2 consumption of different types and thickness of insulation.)

In conclusion, the author wishes to express, his apreciation to A. J. Granata and C. R. Hilton, Pure Carbonic, Inc., for their valuable assistance.

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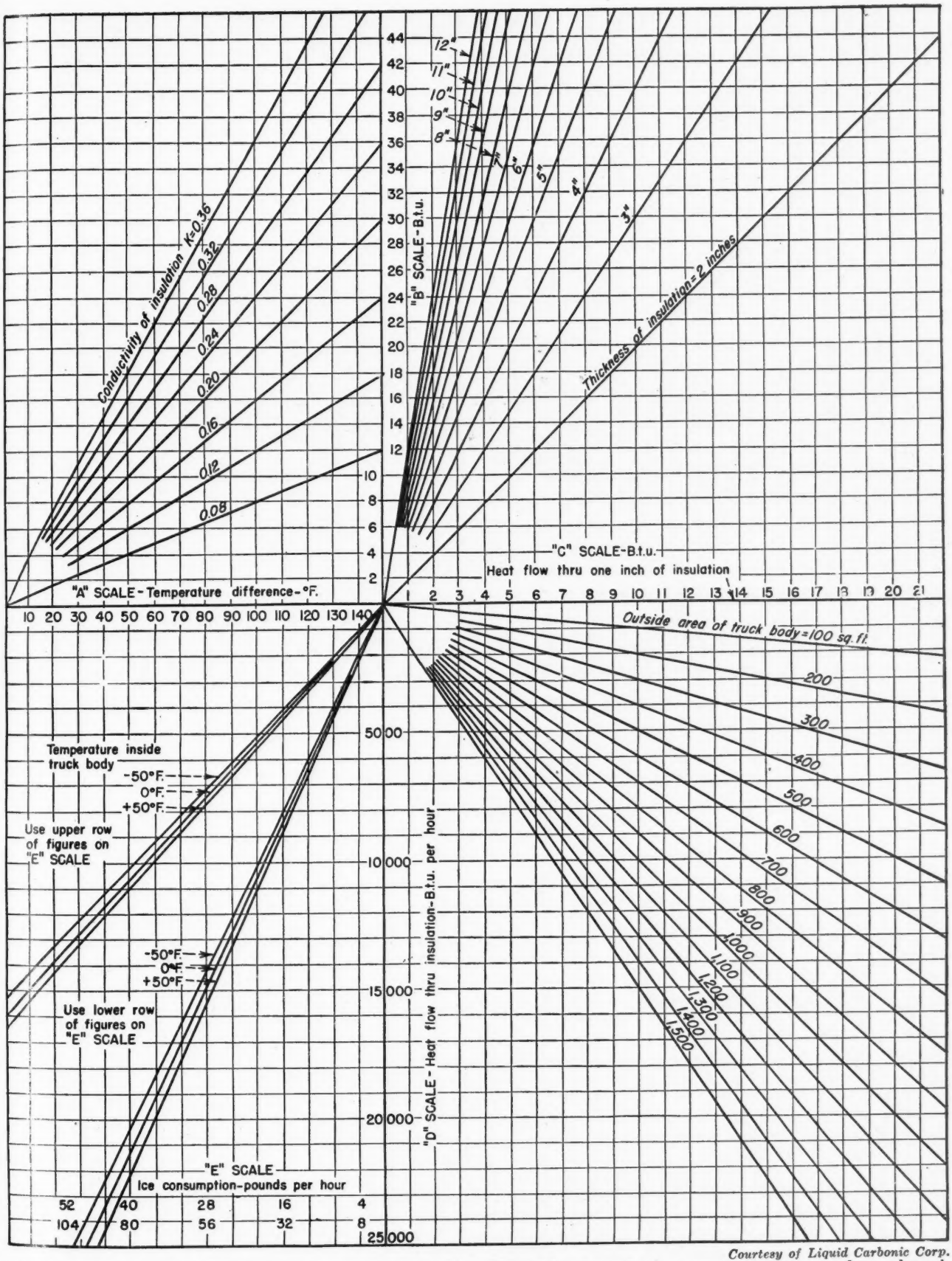
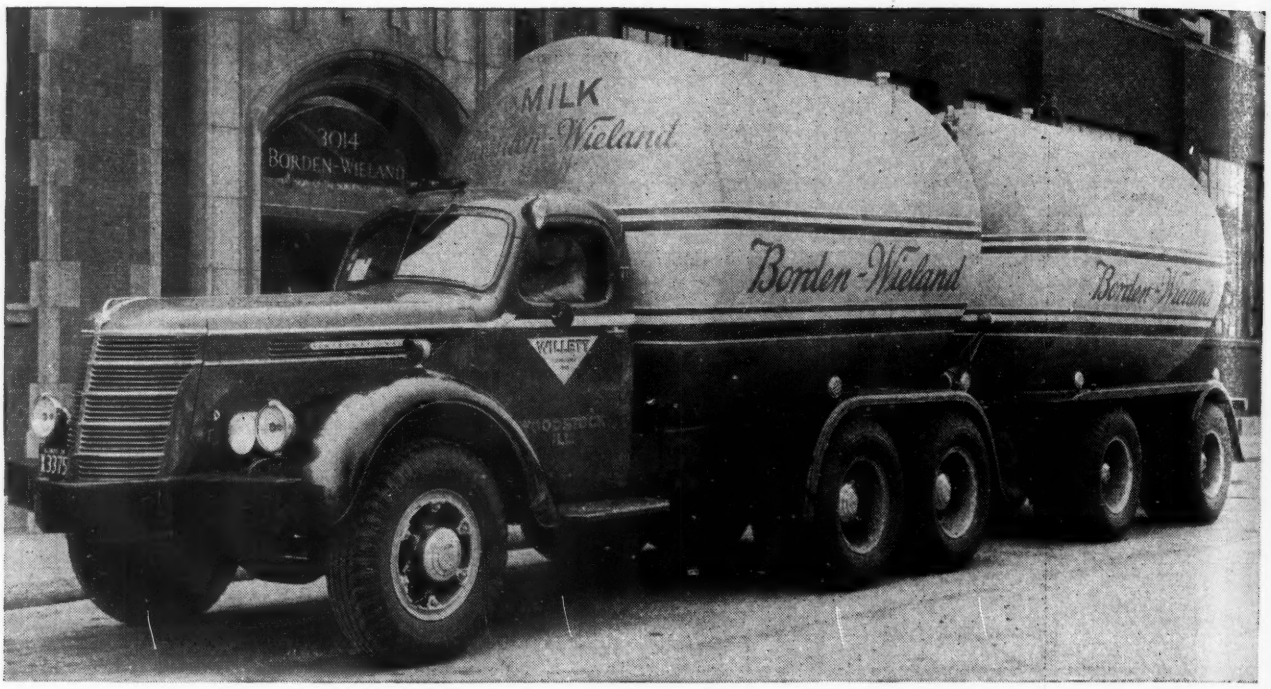


Courtesy of Liquid Carbonic Corp.

Chart for determining solid CO_2 consumption. Example: Truck body is insulated with 5 in. of Dry-Zero ($K=0.24$), external surface is 350 sq. ft., temperature in the body is 0 deg. F., outside surface temperature is at 78 deg. F. Solution: Starting at 78 deg. on the "A" Scale, run vertically upward to $K=0.24$, then horizontally to the right to the 5-in. thickness line, then vertically downward to the 350-sq. ft. line, thence horizontally to the 0 deg. F. line, and finally vertically downward to the "E" Scale where the ice consumption in pounds per hour is read. The upper three temperature lines above the "E" Scale are drawn to twice the scale of the lower lines for more accurate reading of smaller ice consumption. If the external surface temperature of the body is taken as that of the surrounding air, the predicted ice consumption will be 10 percent to 15 percent high. But for most design purposes, it is sufficiently accurate to make such an assumption.



After a survey, the Truck Leasing Corp. proved to the Borden-Wieland Co. that this highway milk train could transport raw milk, from within a radius of 100 miles to pasteurizing plants in Chicago, at a cost lower than rail shipments. Four such leased milk trains have been in operation for the last 6 to 7 years. The tractors are Internationals, with diesel engines.

TRUCKS AT YOUR SERVICE

All you do is employ the drivers. A leasing company provides the trucks, painted and lettered as you specify. And it assumes all the operating worries, perhaps at a lower cost than you can do it

NATIONAL Truck Leasing System, formed in January, 1945, enables the automotive distributors of food and other products, in the principal cities of the country, to lease equipment anywhere in the United States on a uniform contract basis.

The system is a nonprofit service corporation, composed of old, established truck transportation companies. It provides one centralized control through which the main office of the distributing company may arrange for automotive transportation, or deliveries, at any point in its sales area. At the same time, the distributing company's local offices or plants retain the necessary supervision over the services rendered by the local member company of the system in each locality.

Independent Group

The N.T.L.S. is not affiliated with any truck, body, parts, or accessory manufacturers. Its member companies may thus purchase, on the open market, the equipment best suited to do the work

More than half the member companies are old established trucking companies that can provide ordinary trucking service with their own drivers, in addition to the leased service with the distributing companies' drivers. This is a distinct advantage to the distributing company, since it may centralize all its transportation dealings with one member company in any given locality. Most local truck leasing companies cannot render such a service because their business is usually exclusively leased accounts.

Cost Survey

When desired by a member company, the N.T.L.S. will make an expert transportation survey of the operation for which leased trucks are being considered. This is for the purpose of engineering the equipment to suit it for the work at hand. Thus the lowest transportation costs can be obtained.

Sometimes these surveys result in unexpectedly-large savings. For example, one large Chicago restaurant chain employed a fleet of 19 electric and gasoline trucks. The transportation survey indicated the desirability of changing the vehicle types, capacities and bodies. When these were made, a fleet of eight gasoline trucks did the work of the previous fleet of 19 vehicles, at less than half the former cost.

Another such survey indicated that highway tractors and tank trailers could deliver raw milk, from within a radius of 100 miles of the city pasteurizing plants, much faster and cheaper than in shipping by rail. Today the fleet of four such highway tank trains, hauling the milk, has a continuous satisfactory record of seven years of service rendered by one of the N.T.L.S. member companies.

In the past, the national distribu-

tor of a food product had the choice of maintaining his own fleets of trucks in various localities, or dealing with a separate truck leasing company in each locality, if leased trucks were employed. But with the advent of N.T.L.S., he need deal with only one company on a uniform basic contract.

Local Contracts

In such cases, the contract is made up of as many parts as there are member companies involved, with each member company signing that part covering the vehicles to be leased in its own locality. Rates may differ in each locality because of the variance in local costs and operating conditions. But in each instance, the rate is calculated on the same two basic charges, a cost per week for the use of each truck, or tractor and trailer, and a specified charge for each mile operated by each unit.

The two basic charges cover all the truck expenses except the wages of the driver, who is employed and supervised by the company leasing the equipment. The N.T.L.S. member company does not interfere with the selection, supervision or retention of the driver unless the latter, by his actions, becames careless or indifferent, or is involved in accidents that clearly indicate his incompetence. In such cases, the leasing member company may request the company leasing the truck to replace the offending driver with another more desirable man.

Under the truck-leasing contract, the member company provides vehicles painted and lettered as specified by the leasing company and keeps the vehicles in proper mechanical condition and appearance at all times. Also, as the trucks become old in service, they are replaced by new ones at predetermined mileage intervals. Thus to all intents, the company leasing the trucks has its own fleet of trucks with its own name, advertising trade marks and lettering on each vehicle, but passes to the member company all responsibilities for purchasing all the equipment required, as well as the maintenance of that equipment at all times.

No Investment

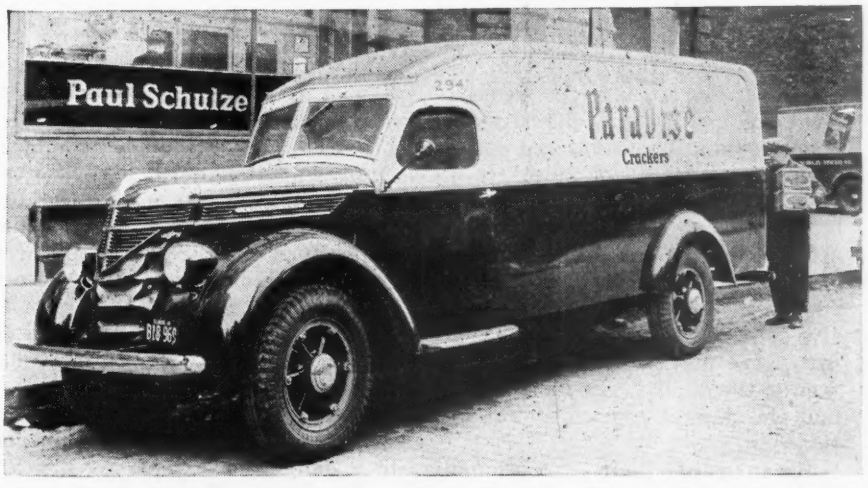
The company leasing the trucks is thus relieved of all capital investment in automotive equipment. If the company had its own equipment prior to the signing of the leasing contract, the member company as part of that contract, will purchase all such prior equipment at a fair market price. This purchase of prior equipment by the member company includes all standby or peak-period vehicles that may be on hand. If the transportation survey indicates that fewer vehicles are necessary to perform the work, the excess vehicles are purchased so that the entire capital investment is eliminated.

The main N.T.L.S. office is centrally located, nationally, at 540 North Michigan Ave., Chicago. Its officers are Charles Clark, St. Louis, president; John Black, Birmingham, Ala., vice-president; Ray Munder, Philadelphia, secretary, and Howard L. Willett, Jr., Chicago, treasurer.

Member companies are located in the principal cities of the United States, including New York, Chicago, Philadelphia, St. Louis, Los Angeles, Boston, Baltimore, New Orleans, Cleveland, Pittsburgh, Kansas City, Portland, Ore., and Seattle. Other member companies are in Buffalo, Toledo, Harrisburg, Norfolk, Birmingham, Louisville, Knoxville, South Bend, Indianapolis, Grand Rapids, Kalamazoo, Milwaukee, St. Paul, Peoria, Des Moines, Lincoln, Wichita, Tulsa, Oklahoma City, Galveston, Houston, Denver, Oakland, Dayton, Columbus and Cincinnati.

Among the member companies are, Truck Leasing Corp. of America, Chicago, Yellow Rental Inc., Philadelphia, Truck Rental Co., Baltimore, Cleveland (O.) Cartage Co., Columbus Terminals, St. Louis, Baker Truck Rental, Inc., Denver, California Truck Rental Co., Los Angeles, Rudi Wilhelm Warehouse Co., Inc., Seattle, and Dixie Drive-It-Yourself, Inc., Birmingham.

This is one of 25 trucks, leased by the Lloyd J. Harriss Pie Co., Chicago, through the Leasing Corp. of America, for local deliveries. The trucks are leased at a fixed charge plus mileage rate. The Harriss company employs the drivers, but all other responsibilities including fuel, storage and maintenance are assumed by the leasing corporation.



The leasing corporation provides trucks painted and lettered to the employing company's specifications, so that to all appearances they might be the company's own trucks. Here is one of 14 trucks leased to Schulze Baking Co., Chicago, for local use.

WAYS TO SAVE WATER In The Food Plant

By IRVING REICHMAN, Water Inspection Division,
Department of Water Supply, Gas and Electricity, City of New York.

PART I — Because large quantities of water are used, conservation is a must. It saves much more than water expense. Here is an all-inclusive analysis of water conservation problems, with pointers on supply and disposal.

WHETHER used as an ingredient or in processing, water is a prime essential in food manufacture. There is scarcely a food product which does not use water in its preparation. Even for dehydrated foods, where removal of water is the goal, water is used in large quantity. The commercial preparation of foods falls within the domain of public health, and it is but natural that food industries should be large consumers of water.

The primary requirements for a satisfactory water supply are: That it shall be of suitable quality and that it shall be adequate in quantity. A supply, for example, may be ample in quantity but its quality may be such as to require costly treatment to condition it for use. Or a supply of excellent quality may be of unreliable or limited quantity. Water, unlike the artificially created utilities whose output may be controlled at will, is strictly a product of nature. Man can change the quality of the water supply, but it is nature, generally speaking, which determines the quantity. Widespread droughts and accompanying water shortages have been acutely felt in recent years, and cities throughout the country have inaugurated conservation programs and insituted regulations designed to reduce water waste without curtailing needed use. Water conservation has become an important national program.

Besides satisfying the requirements of quality and quantity, the supply should be obtainable at reasonable cost. Public supplies are invariably of good sanitary quality, but the cost and quantity available are variables which depend on local or special conditions. In localities where water is so scarce or expensive as to necessitate excessive sparing, there may be a deleterious effect on the quality of a food product and the danger of inadequate factory sanitation.

Because of their exceptionally high water demand, food factories discharge enormous volumes of liquid wastes, and the majority of these effluents carry considerable quantities of putrescible matter.

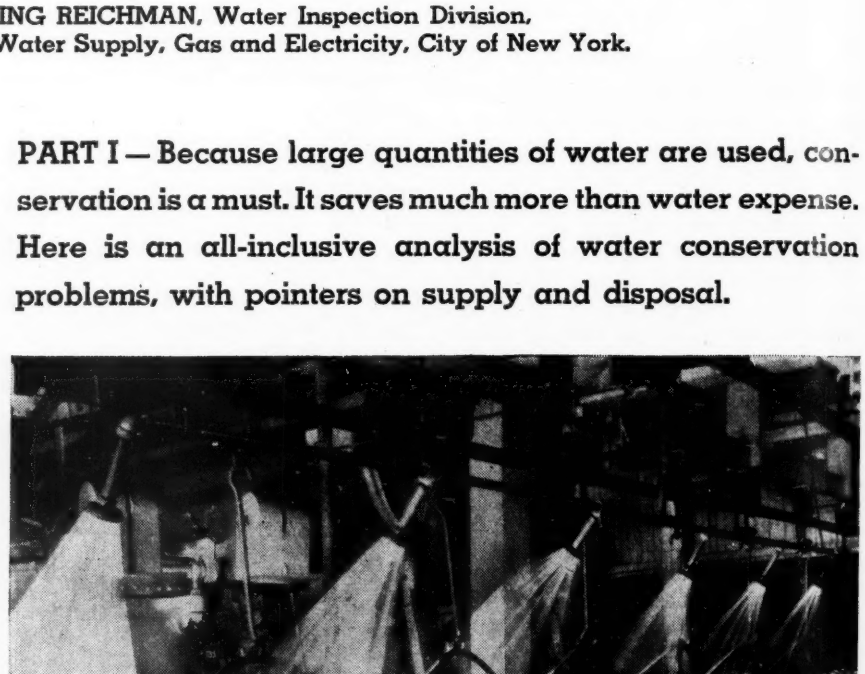


FIG. 1. Sprays reduce water requirements for cooling cans after processing. Water can be recirculated.

The problem of waste disposal is frequently an influencing factor in water usage. A factory, for example, may obtain a good, ample and cheap supply of water, but it may be situated in an area where facilities for liquid waste disposal are inadequate. Such might be the case where no sewerage system exists or where local regulations prohibit or restrict the use of public sewerage systems or nearby watercourses for industrial waste disposal. To meet this inadequacy, it may become necessary to cut down water consumption to a dangerous extent.

Untreated effluents from a variety of food plants discharging into streams constitute a hazard to fish and other aquatic life and, as a result of bacterial action, are often the cause of odor and other nuisances. In its outstanding and widely recognized report on water pollution, the National Resources Committee found:

"Water pollution is a problem of national concern. It is especially serious in the relatively populous and highly industrialized northeastern section of the country. Responsibility for abatement of pollution is primarily local...,"

And under the heading of Industrial Waste, the report further states:

"The manufacture of foods and beverages accounts for the largest production value of any single group of industries contributing to stream pollution. These food and beverage industries are also distributed most widely,

because the processing of perishable commodities, such as dairy products and meat from nearby sources, is performed to large extent close to market. The food-canning industries, on the other hand, are located at or near the source of supply, and therefore pollution from these industries occurs in a great number of focal centers distributed throughout the country. With the exception of concentrations of meat packing in Illinois and Iowa and of canning in California, the total production of nearly 9 billion dollars was distributed in general conformity with the density of population. For the food and beverage industries, the production figures are in general accordance with the known facts of water pollution. Local dairies, abbatoirs, and the like which serve a restricted area constitute a pollution problem roughly proportional in magnitude to the density of population. This is reflected in the large value of the products in the industrial centers in New England, the North Atlantic States, and the industrial States of the Middle West. Exceptionally severe pollution problems are associated with the meat-packing industry in Illinois, Minnesota, and Iowa, the dairy product; industry in Minnesota, Wisconsin, and New York, and the canning industry in California, New York, Wisconsin, and other States. . . ."

A number of regulatory codes require at least partial treatment of industrial effluents before these are discharged into the public sewerage system or local watercourse. The most recent trend among municipal authorities is to have individual companies pay their share of sewage-disposal and treatment costs. Various assessment formulas based on factors such as sewage flow, population equivalent, cost of chemicals and handling have been and are being proposed. Judging by present tendencies, it is but a question of time when industrial sewage treatment by municipalities will be paid for by the individual contributor, just as municipal water is paid for by the individual consumer. Unnecessary consumption of water means additional sewage to be treated.

General Cleaning Use

By far the biggest general use of water in food industries is for nonprocess washing and cleaning. Such use includes the washing of tables, conveyors, pans, vats, kettles, other utensils and processing equipment, the washing of floors, walls, troughs and drains, and any other plant sanitation requirements. In addition, there is the use for general outside cleaning, such as the washing of tanks, bins, conveying flumes, platforms and tank trucks.

The general utility water requirement demands not alone quantity, but in the majority of cases the water must be of drinking-water quality. In some food industries, for example dairy and meat products manufacture, the ingredient and process water uses make up the smaller portion of the total potable water consumed, the bulk—perhaps 70 percent or more — going into washing and cleaning. Untreated well water may be good enough for floor washing but not be safe for equipment use, and boards of health will usually prohibit the existence of a dual — safe and unsafe, or doubtful—supply in the processing and food containing portions of a plant or factory. This prohibition ordinarily does not apply to steam generating and condensing, refrigeration and other thermo-dynamic or mechanical uses where the nonpotable water supply does not come in contact with the raw or finished product, food containers or any processing equipment.

Shut Off Hose

Although it is not good economy to save water at the expense of plant sanitation, a great deal of water in this category is unnecessarily wasted through carelessness, indifference or lack of proper operating facilities. Carelessness and indifference are exemplified in the failure of operators to turn off pumps, taps or valves when not in use, failure to prevent tanks from overflowing, using more water or for a longer time than the particular job demands, and so forth. A few conspicuously placed placards or stencils bearing such legends as "Please Turn Water off When Not in Use" or "Water is Costly — Please Save It" are often helpful.

The use of hoses presents a special problem. In milk and dairy plants, breweries, canneries, meat packing and a number of other food plants, hosing is the most practical and most popular cleaning method. If the water were used only as

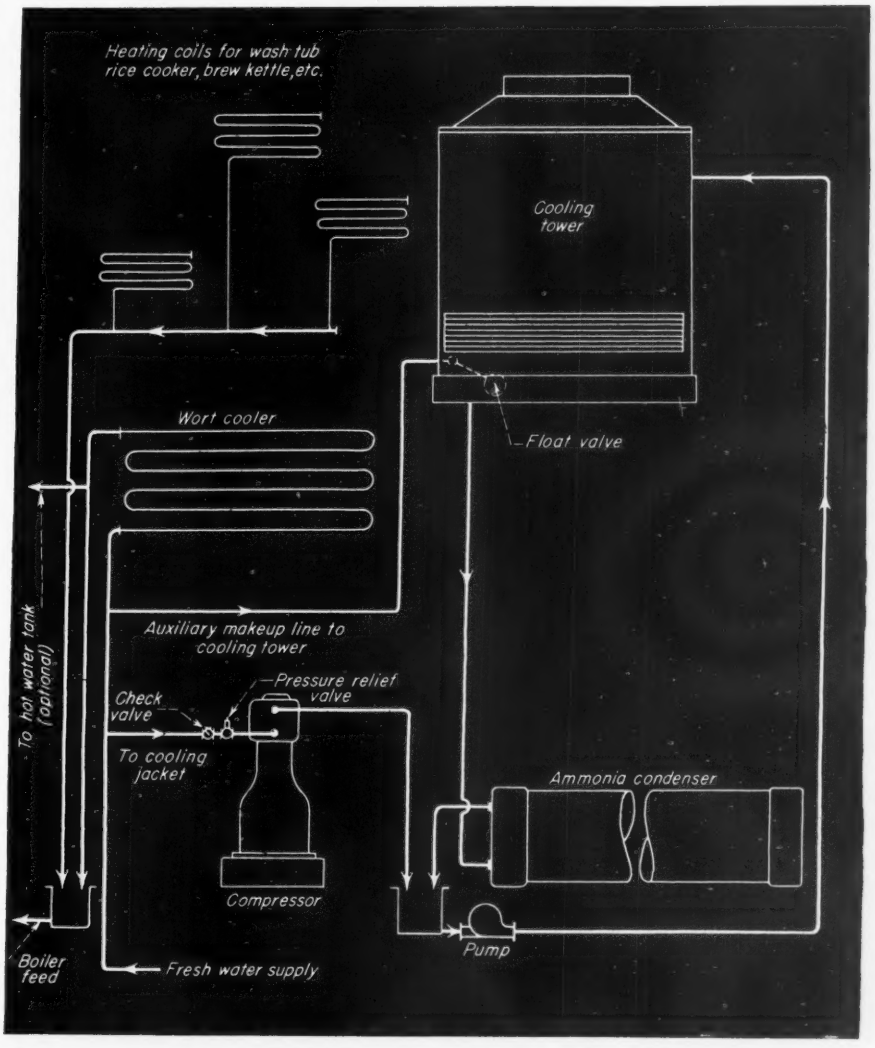


FIG. 2. Brewery water economy circuit. In one brewery this system redu ed water consumption from the usual 10 to 15 bbl. to about 5 bbl. per barrel of beer. An additional city water makeup feed for the boilers is not shown.

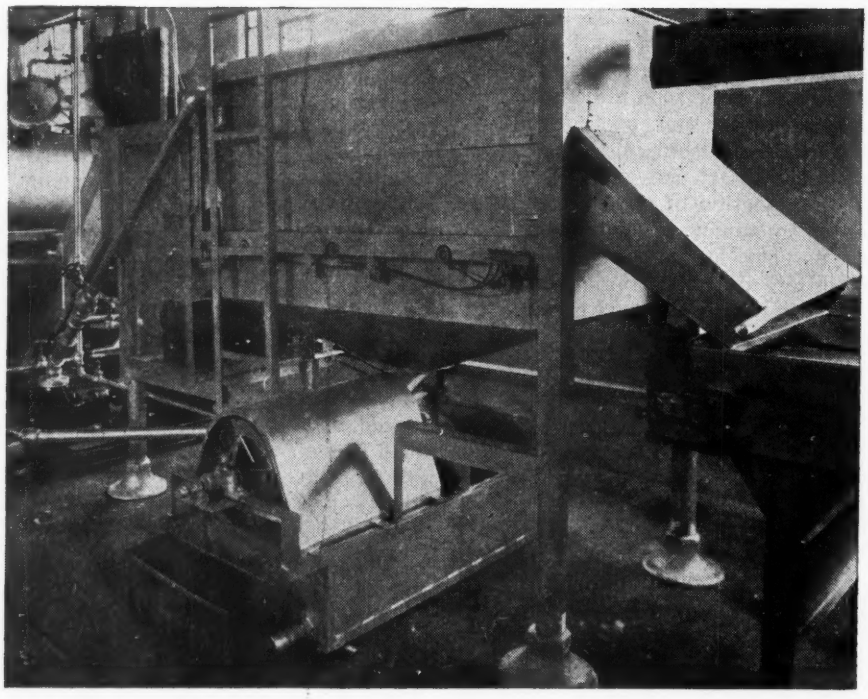


FIG. 3. Recovery of wash water in a steam peeler has cut water consumption more than half. Skins are removed from the water by a conveyor operating in a perforated trough. Water is strained before recirculation.

needed, there would be no difficulty. But with hoses having no nozzles, or without self-closing spring actuated or lever type nozzles, a common practice is to let the water run continuously. Seldom will an operator walk over to the hose control valve to turn the water off between applications—especially if the hose length is 25 ft. or more—although in large plants, scrubdown, cleaning and rinsing may take several hours. In milk plants and breweries, more than elsewhere, it seems that the free-running hose has almost become an accepted part of the cleanup procedure, and on many occasions the writer has seen hoses running unused during the operating period as well.

One reason frequently given for not using, or for discontinuing the use of, spring-actuated hose nozzles is that they cause water hammer, or pounding. Water hammer is the hydraulic surge and impact effect which develops when the flow of water in a pipe is suddenly arrested, as occurs with quick-closing valves. Water hammer is annoying and its effects are frequently destructive to equipment, but there are a number of devices on the market for correcting it. These are generally pressure relief valves or surge suppressors of one type or another. Air chambers are also commonly used for this purpose.

The free-running hose is a problem not alone of water conservation but, with steam and hot water, it becomes one of fuel conservation as well. Furthermore, where water must be pumped and perhaps filtered, softened or otherwise conditioned for use, waste is even more costly.

One large dairy company found the free-running hose such a serious water and fuel waste problem that it instituted a research project for its elimination. Special hose nozzles were developed and means devised to control water hammer. In addition, new cleaning procedures were introduced. The results, after two years trial and improvement at several of the company's plants, show gratifying savings of water and fuel. No data on this project have been released up to the present because it is still in the developmental stage, but details will be made available by the company at a later date.

There is still another undesirable effect of the free-running hose. In refrigerated rooms such as brewery cellars, storage rooms and packing rooms, the open flow of water tends to add heat to the space. This is especially undesirable in summer when water temperatures are highest and refrigeration load is peak.

Process Water

The uses of water incidental to food processing or preparation may be roughly grouped as follows: (1) Product cleaning, which includes preliminary soaking, spray and immersion washing, peeling and rinsing. (2) Heat processing, including preheating, spray and immersion blanching, cooking and pasteurizing. (3) Product cooling, comprising spray and immersion cooling, the use of water-cooled coils and jackets and refrigeration plant. (4) Miscellaneous uses and applications, such as the washing of product containers (*i.e.*, bottles and cans) filter and filter-aid washing, conveying flumes and water-jet vacuum condensing.

Product Washing — In the fruit and vegetable canning industry, where raw-product cleaning is a principal water-consuming item, economy is generally best achieved by using a combination of immersion soaking and spray washing. With conveyor-type washers, where conditions permit, the cleaning operation may be divided between two sets of sprays and the preliminary soaking tank. Fresh water is supplied first to the final rinse nozzles. The spent discharge from these nozzles is collected in a catch basin and pumped to the wash sprays, after which the water flows to the soaking tank by gravity. From this tank it overflows continuously to waste. Where conveying flumes discharge the incoming product directly into the washer, part of the spent flume water is sometimes used for washing.

The rotary-type washer generally permits of better water economy than the straight belt type, provided the product can stand handling in such a washer. This, of course, is true under any water-supply conditions, but it is particularly important in localities where the water supply is chronically short or unreliable.

Regarding spray efficiency, there are a few points worth noting. The relation between sprays and product should be such that the spray water acts intimately on the entire surface of the product being washed. Where the distance between the nozzle openings and the product is too great, much of the energy in the water will be dissipated through pressure drop, resulting in a loss of cleaning effect. When fanning out of the spray occurs, there may be a waste of water because of unused spray area. The nozzle header position should be adjusted for the product or belt.

Another condition which may lead to loss of washing efficiency exists when nozzles are too closely spaced, so that adjacent sprays strike each

(Turn to page 206)

Food Chemists Helped Britain To Weather the War

By D. W. KENT-JONES, Consulting Chemist, London, England

There were shortages, long hours of work and sleepless nights, but people were reasonably well fed—thanks in no small part to the technologists. What they did with flour and bread is told here

WHEN war comes, the chemist comes into his own. This was particularly true with respect to the food chemist in World War II. The chemist in the food industry in Great Britain certainly played his part. Without him it would have been difficult to have weathered the storm.

Perhaps it was as well in the days after the collapse of France—when this country and the Empire stood completely alone, possessing few armaments and relying mainly on food from overseas — that people generally did not quite realize how bad things actually were. Perhaps we were too busy — or too stupid! Everyone knew that the U-boat menace was serious. Fortunately, few knew how serious. The Ministry of Food rationed food with increasing severity and generally did its job excellently. In this it was assisted by chemists in the food industries. Some advised the Ministry at its various centers. Others saw that the masses of new, but necessary, regulations were carried out, that waste was avoided and that the best possible use was made of raw material.

Speaking From Experience

Few Americans can realize the strain the average person in Great Britain was then undergoing. There was less food, the hours of work were much longer, fire watching had to be done and, above all, there was the continual strain of the "blitz." It was not easy to face, with a depleted staff, an abnormally heavy day's work on unaccustomed food after a wearying and—to say the least—disturbed night. One might have to walk to work because of disruption of traffic, and the following night there might be war work lasting many hours—if not all night—such as warden, police or Home Guard duty.

In spite of all this, and although there were shortages of many things, the people were reasonably well fed. The help given by the U.S.A. in this connection will not be forgotten quickly. There was, of course, a lack of meat and fat, and this meant that the diet was monotonous and food generally rather unappetizing. More than ever, flour and bread had to supply a large proportion of the calories and protein in the diet.

Perhaps the writer may be forgiven for a reminiscence of 1940, after Dunkirk. With his partner, Dr. A. J. Amos, and about 20 of the staff, he had evacuated from Dover to London, which was then quiet. For weeks, everyone worked all day reerecting the laboratory in a corner of a dusty factory. Analytical work was attempted under the most difficult conditions imaginable. At that time, and for several weeks, everyone slept on mattresses on the floor of two empty houses which served as hostels. The writer's wife shopped and brought home the provisions for over 20 people—there was no delivery. With only two assistants, the food had to be cooked and the meals served. It was communism with a vengeance! Gradually the hardships were reduced. Furniture arrived, the laboratory was improved and a messing committee was started. What a nightmare was the catering, but somehow it was done.

A month or two later, when the nightly blitz burst upon London, the staff was fit and capable of standing up to the new strain with no apparent falling off in the quality of their daily work. The blitz, opposed by little antiaircraft fire, continued for about 80 nights.

This background has been given only so that readers may appreciate that the planning of the nation's diet was a most important factor.

It is doubtful if the masses of people ever were really short of calories, proteins, minerals or, indeed, any of the principal vitamins. All margarine (so carefully and exactly rationed) was by this time vitaminized, and milk supplies (at the expense of pigs and poultry) were on the whole maintained. There was, of course, little milk for processing, and in the winter months each person had only two pints a week. But bread was always plentiful. The millers and the bakers did a really great job in spite of the almost daily destruction of mills and bakeries.

Bread Controversy

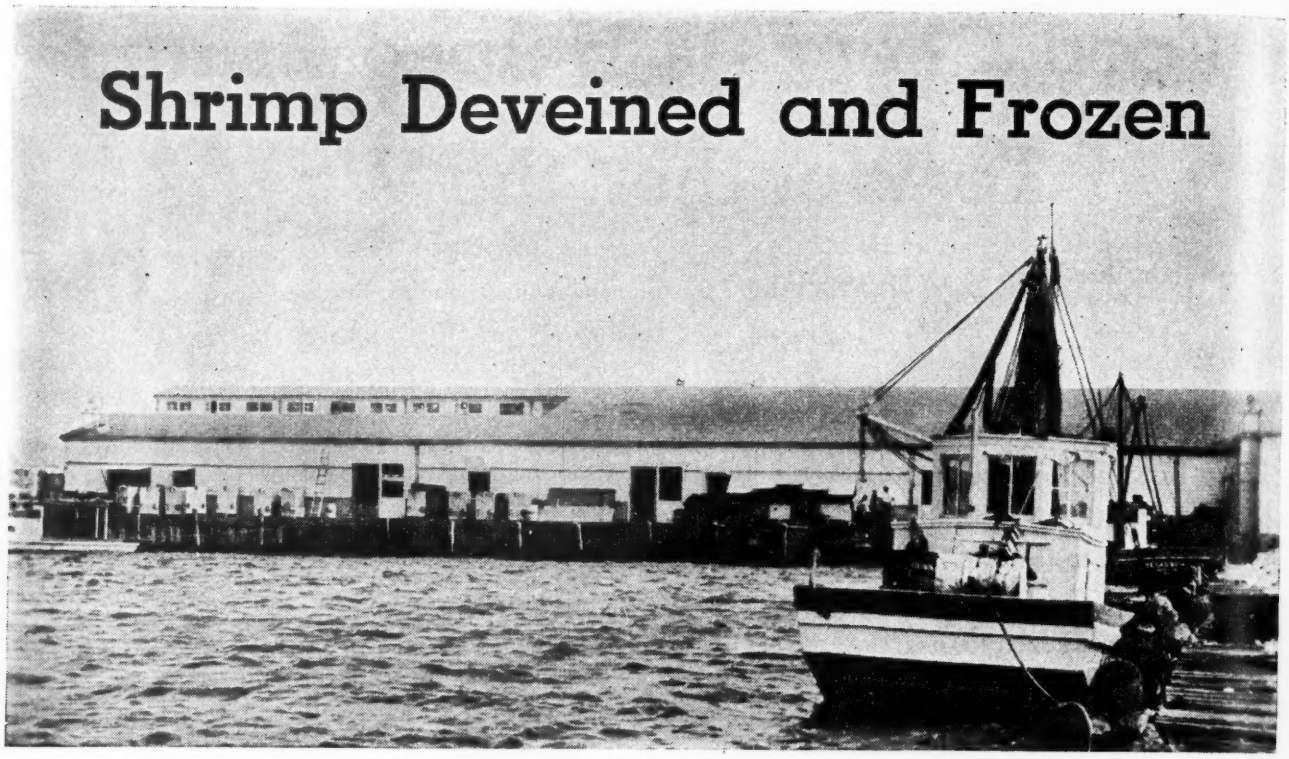
Naturally, the controversy about the type of bread—white or brown —rose to fresh heights. But this was cut short when the Ministry of Food decided, for shipping reasons and

(*Turn to page* 220)

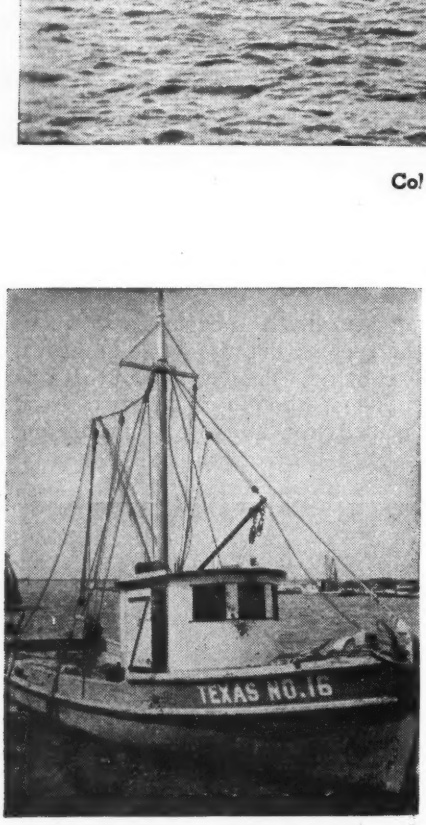
British-Combine

Londoners in the tube shelters during the blitz were supplied with food by the Tube Refreshments Special. Bread was a mainstay in the wartime diet of the people throughout Great Britain.

Shrimp Deveined and Frozen



Colter Co.'s plant and boat slip at Palacious, Tex.



One of the 20 shrimp boats owned and operated by Colter Co. Boats are 40 ft. long and powered by 100-hp. diesel engines. Cargo holds are ice refrigerated.

Jumbo shrimp from the Gulf of Mexico are deveined by an ingenious machine and frozen in the modern plant of Colter Co. to help meet a growing demand for seafood. In off-season periods, eggs are frozen to keep plant busy

By C. R. HAVIGHORST, Assistant Editor, San Francisco

JUMBO-SIZE shrimp have been linked historically with Louisiana's seafood industry, although they are found in many other locations along the broad sweep of the Gulf of Mexico. In answer to a growing demand for seafood, a number of new shrimp processing plants have been erected along the Gulf in recent years. In Texas, one of the most modern shrimp freezing plants, is that of Colter Co., in Palacious, this company being a subsidiary of Kroger Grocery & Baking Co.

Current demand for fresh and processed shrimp far exceeds the present supply. Shrimp are available, but the weather plays an important part in the fishing operations. It is impossible to handle the heavy nets during a period of high winds or when there are heavy ground swells at sea.

Along the Texas shore of the Gulf, the shoal waters where shrimp are seined lie approximately 10 miles out. This proximity of supply is said to provide an economic advantage, as well as a raw product of high quality.

This company operates a fleet of shrimp seiners, but it supplements their catch with purchases from independent fishermen during the season. Shrimp boats usually are operated by a crew of two. The captain acts as pilot and, when necessary, helps the crewman, whose job it is to handle the net and gear. A power winch at the base of the mast simplifies the handling of the heavy net.

When the catch is brought aboard the net is emptied onto the deck and the crewman removes any gilled fish or extraneous marine life from the catch. Then the shrimp are washed down, placed into the hold and packed in ice.

Preparation and Processing

Upon delivery to the plant, the shrimp are washed thoroughly and dumped on to metal tables where women workers remove the heads. The headless shrimp then are loaded onto the stainless steel tops of the shrimp deveiners.

The action of the shrimp deveiners resembles, somewhat, that of one type of sardine-filleting machine used in California, with the exception that the sardine machine

has two stationary knives in place of the circular saw in the deveiner.

The operator drops the shrimp, back side down, into the small flume leading to the V-shaped belts in the deveiner. A pressure spray then forces it down the flume, at the end of which it is caught up by the conveyor belts. The shrimp reaches the counterbalanced wheel and the circular saw still lying on its back. In this position it is shaped like a crescent, whose convex side faces the saw.

In order that the saw may remove the vein entirely from the back of the shrimp and also rout away a minimum of meat, the wheel presses it against the saw with a uniform, light pressure as it is conveyed across this point in the machine. As the shrimp emerges from between the saw and wheel a high-pressure spray washes out the saw cut. The conveyor then carries the shrimp to the end of the machine and drops them into a flume, from which they are moved to the next operation. The weight, or counterbalance, may be adjusted backward or forward, to increase or decrease the pressure of the wheel on the shrimp and thus control the depth of cut made by the saw.

Shrimp are graded according to the number required to weigh a pound. Thus a 20-count grade would mean 20 shrimp to a pound. The capacity of a unit of the deveining machines depends largely upon the size of the shrimp being processed, but it is estimated that one unit will handle an average of 160 lb. per hour.

The advantages of deveining are twofold. First, the removal of the unsightly vein, which runs nearly the full length of the shrimp's body. Near the tail the vein goes through the meat to emerge on the bottom side. But since it cannot be seen and is not injurious, no effort is made to remove this part. The second advantage is that the saw cut through the outer shell of the shrimp makes the removal of the shell, after cooking, much easier.

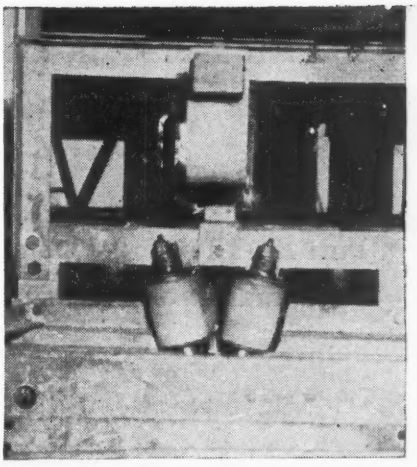
Shrimp Frozen

All the shrimp in this plant are frozen in 5-lb. blocks. The shrimp are weighed and then placed into shallow rectangular pans which are stacked in mobile open racks. Each rack, or dollie, is of a size that will occupy the entire space in one freezing tunnel. Fans in the tunnels are located in the rear walls. They drive air at subzero temperature over the product, then draw it across refrigerated coils and recirculate it through the tunnels.

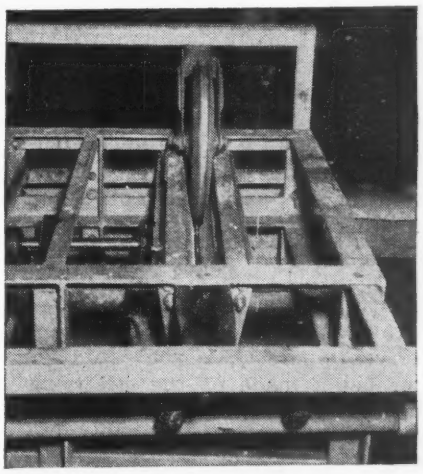
The plant operates its own freezing storage, where sufficient frozen product is accumulated for shipment.

Eggs Also Frozen

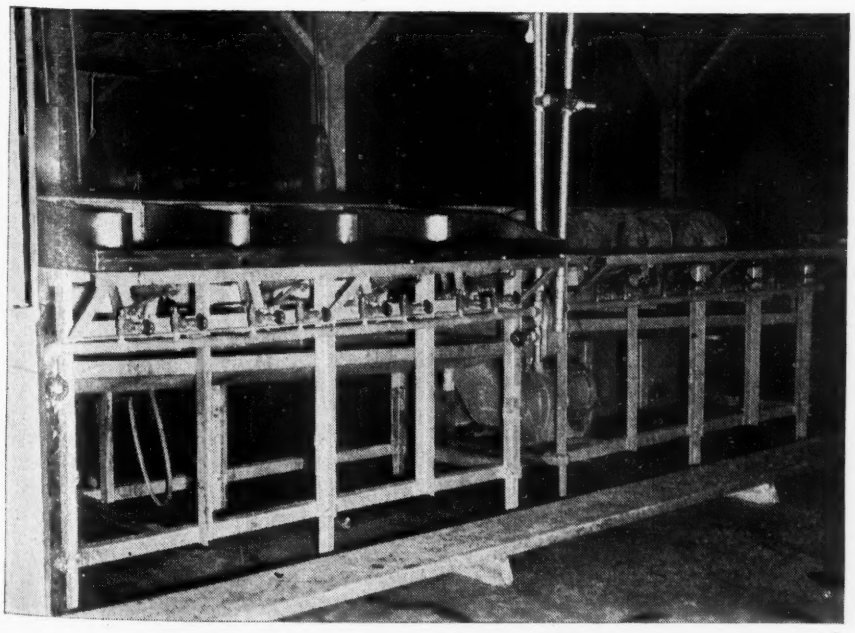
Surrounding Palacious, Tex., is one of this State's large poultry- and egg-producing regions. During off-season periods for shrimp the plant freezes eggs for the parent company's baking operations.



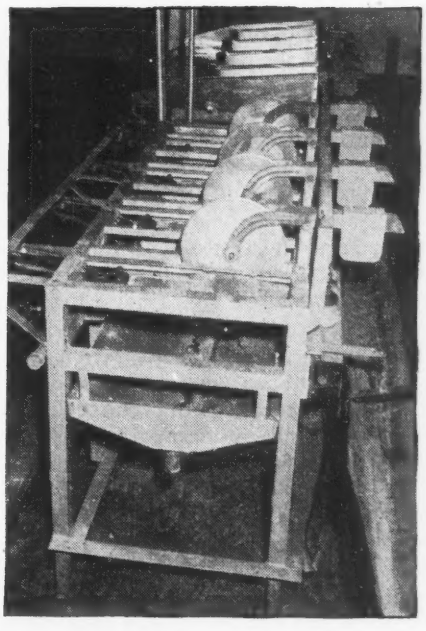
Rear view of machine, showing V-shaped, webbed-belt conveyor.



Front or feed end of deveiner. Circular saw is directly underneath the counterbalanced wheel.



Front view of shrimp deveining machine. Machines are arranged in series of four units. They are entirely covered for the safety and comfort of operators. Water sprays are deflected by this stainless steel cover, and the top of it serves as a table where the headless shrimp are dumped.



Side view of deveiner. Stainless steel cover removed from nearest machines to show operating parts. Deveined shrimp fall into flume at back of machine.

WHAT TECHNOLOGY MEANS TO THE CANNER *

Part II—The food technologist's jobs in the cannery are many and important. The author discusses the responsibilities in connection with warehousing, control of quality and of supplies, waste disposal and byproduct utilization

By G. C. SCOTT, Research Director and Production Manager, Minnesota Valley Canning Co., Le Sueur, Minn.

WAREHOUSING is important to the food technologist because the storage temperature of most canned foods is an important factor in the life of the wholesomeness of the product and in the corrosion resistance of the container. The food technologist also is interested in the prevention of rough handling of containers to reduce spoilage. The freezing of certain canned foods seriously affects their quality. High humidity causes sweating and subsequent rusting of the containers. A serious study is now being made of the effects of storage temperatures on the vitamin content of canned foods. The results of this study may indicate corrective factors which must be applied to warehousing.

Another Responsibility

A third important division of the food technologist's job is that of issuing specifications and making analyses of what we commonly term "supply items," such as cans, jars or bottles, caps, shipping containers, sugar, salt and other condiments. The canned-foods technologist must be able to tell a good can from a bad can and to instruct the operating personnel in watching for damaged containers prior to the time that they reach the filling line. The same inspection is necessary in the case of caps and jars. Frequently, damage occurs in transit and, in many instances, persons skilled in can manufacture are needed to determine whether or not the containers have been so severely damaged that they should not be used. The fruit canner is particularly interested in getting as much tin on the can as possible to prevent corrosion. Vegetable canners are not subject to the same hazard to the same degree, although many tomato products are just as corrosive as some fruits. In these days of too little tin, a very serious problem is involved in distributing this tin so that it will be of the maximum benefit in preserving our supply of canned foods. Such problems, however, have been studied and quite well solved through the efforts of the laboratories of the container manufacturers.

Shipping containers complying with specifications as to sizes, quality of materials and resistance to certain pressure tests, tear tests, crush tests and the like are important to insure delivery of canned foods in good condition to the retail stores.

Sugar specifications are important in holding down the bacterial contamination. National Canners Association has issued specifications for sugar, but each batch must be sampled and analyzed to see that it meets these specifications. Canners know that salt containing quantities of calcium and magnesium tend to toughen the skins of peas, so all salt used in the canning of peas should be of the lowest possible calcium and magnesium content. Even the water used in canning peas should be as soft as possible in most instances. It is the food technologist's job to recommend types and quantities of softeners.

Controlling Quality

Another general classification of a canned-foods technologist's duties includes that of quality control. This begins with the segregation of raw produce according to its quality. It is the food technologist's responsibility to recommend to the operating personnel the procedure to be followed with each class of raw produce received. This practice avoids the temptation to try to make a high-quality product out of low-quality raw material.

Since sanitation and inspection operations are a very important part of quality control, definite procedures must be set up. Operating precautions must be taken to see that no two grades are mixed and so that each grade is identified throughout the process and by the code mark on the container. The food technologist must set up grade standards for the raw produce for the particular commodities. These need not necessarily coincide with the grades used for growers' payments, as they are for two distinct and separate services.

Know Your Food Laws

The food technologist in the grading division must know all of the Federal and State food laws and regulations. The general counsel for most canneries is rather unfamiliar with this work. For that reason, keeping up-to-the-minute information on changes in these laws and regulations is generally the food technologist's job. This practice is followed particularly in the case of label requirements so that he can inform the sales department about necessary label changes. The technologist also must be in a position to present evidence against contemplated unwise legislation.

From time to time, the technologist in the canning industry is called upon to investigate lots showing high spoilage. A considerable amount of training is necessary to make such a diagnosis. Frequently, the technologist is con-

*Based on a paper presented at the April, 1945, meeting of the Chicago Section of the Institute of Food Technologists.

fronted with problems that only a highly skilled bacteriologist or a highly skilled can manufacturer can solve.

Waste and Byproducts

The fifth general classification of a technologist's duties in the cannery industry involves problems of cannery waste disposal and utilization of byproducts. Vegetable canneries discharge great volumes of sewage, silage, seeds, skins, husks, cobs, and the like. About 65 percent of the corn in-the-husks taken into the cannery goes out as cobs, husks, defective kernels and trimmings. Generally, this is stacked for silage as cattle food. Along with this material goes about 50 gal. of water for every case of corn packed. This waste water runs as high as 4,000 p.p.m. of B.O.D., which presents a very serious problem in waste disposal. The volume is great, the B.O.D. is high, and it is accumulated over a very short period of time. Present methods of solving this difficulty are expensive; much work remains to be done.

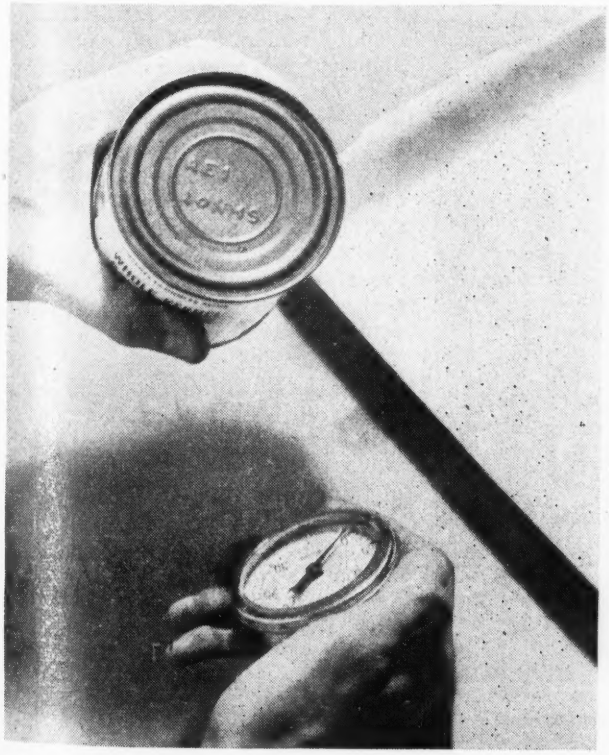
Byproducts such as corn silage and pea vines coming from a pea viner station generally are used for cattle feed. In the Northwest, where the relative humidity is low and vines will dry rapidly, some of these vines are used in the form of baled hay. Pea vines generally are rather high in protein, and if they could be economically dried they would form a very high-protein stock food. Since they contain about 75 percent water, however, as does corn silage, drying them, either for feed or for utilization in other directions, has not been considered economical. We still have hopes that something better than the present method eventually will come out of investigations into the use of this waste material. The regional research laboratories of the U. S. Department of Agriculture are investigating the possibilities of using waste.

As to the waste water or sewage from canneries, continuous research is being done both in the National Canners Association laboratories and by various other people in the country. So far, nothing has been developed that is completely satisfactory from the standpoint of doing a good job or doing it economically. We are sure that all canneries are going to be forced to do something in the treatment of their waste. Most State governments and the Federal government are insistent that these wastes will not be permitted to be discharged raw into streams or lakes. We are a long way from a solution to this problem.

Nutritional Studies

The sixth and last important division of a food technologist's job in the canning industry has to do with studies of nutritional values and other dietary values of canned products. During recent years, this work has received quite an impetus from the discovery of vitamin values. National Canners Association, in connection with Can Manufacturers Institute, is conducting a very broad program of study on this subject. Individual canners, however, should have a great interest in increasing the dietary and nutritional values of their own commodities. This work must of necessity start with the raw produce. Consequently, any breeding program, fertilizer program, cultural practice, plant process, storage method and condition must be completely reinvestigated from this standpoint. Food technologists who are not dietary and nutrition minded today are likely to find themselves in an embarrassing position.

All of this adds up to a big order, and some will ask, "How can we possibly know everything there is to be known about all of these problems?" We can't all be specialists in all lines. However, a lack of working knowledge of any of the aspects of food technology mentioned is a very serious handicap.



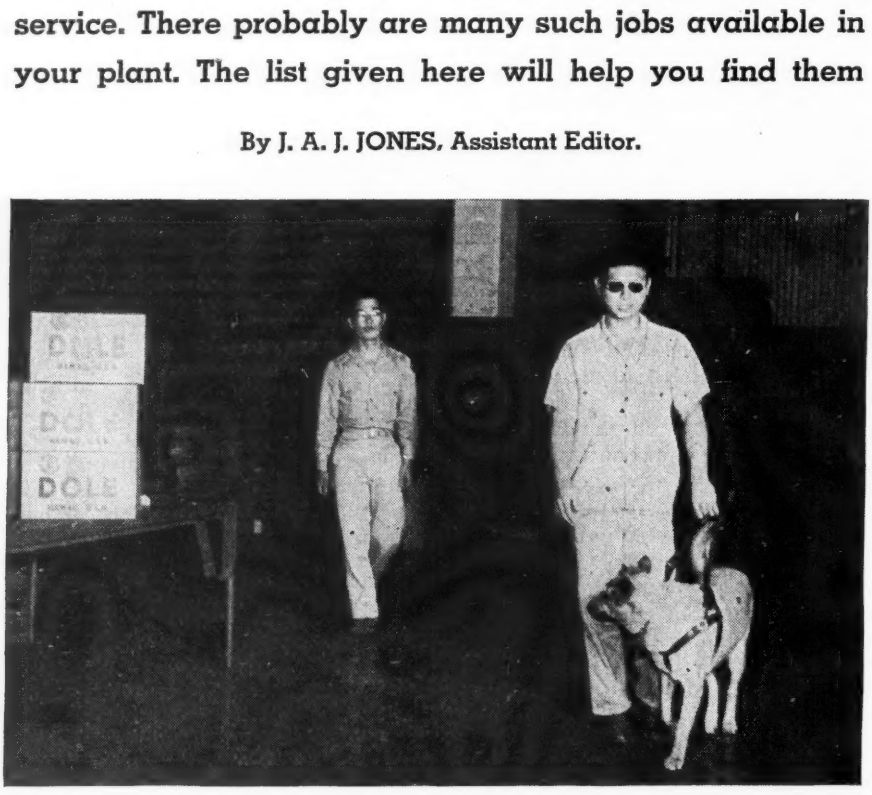
Checking vacuum and code mark on can of corn prior to grading final finished product.

Measuring and recording temperature of cans after processing and cooling.

JOBS FOR THE WOUNDED

Loose-Wiles has paved the way for the immediate employment in productive work of men incapacitated in war service. There probably are many such jobs available in your plant. The list given here will help you find them

By J. A. J. JONES, Assistant Editor.



Box making proves to be within the capacity of this veteran, blinded in the Italian campaign. He is employed by the Dole Pinapple Co. in the morning and studies to be a masseur at a military hospital, in the afternoon. Such part-time employment can become an important factor in the rehabilitation programs now being formulated.

Hanford Main, president of Loose-Wiles Biscuit Co. (right) and James Larrimore, assistant manager and veterans' counsellor, at the company's New York plant, look over one of the first "Welcome" booklets to come off the press. A copy of the brochure was sent to every Loose-Wiles employee in the armed services to assure him not only that a job with the company awaits him, but that his return is eagerly anticipated.

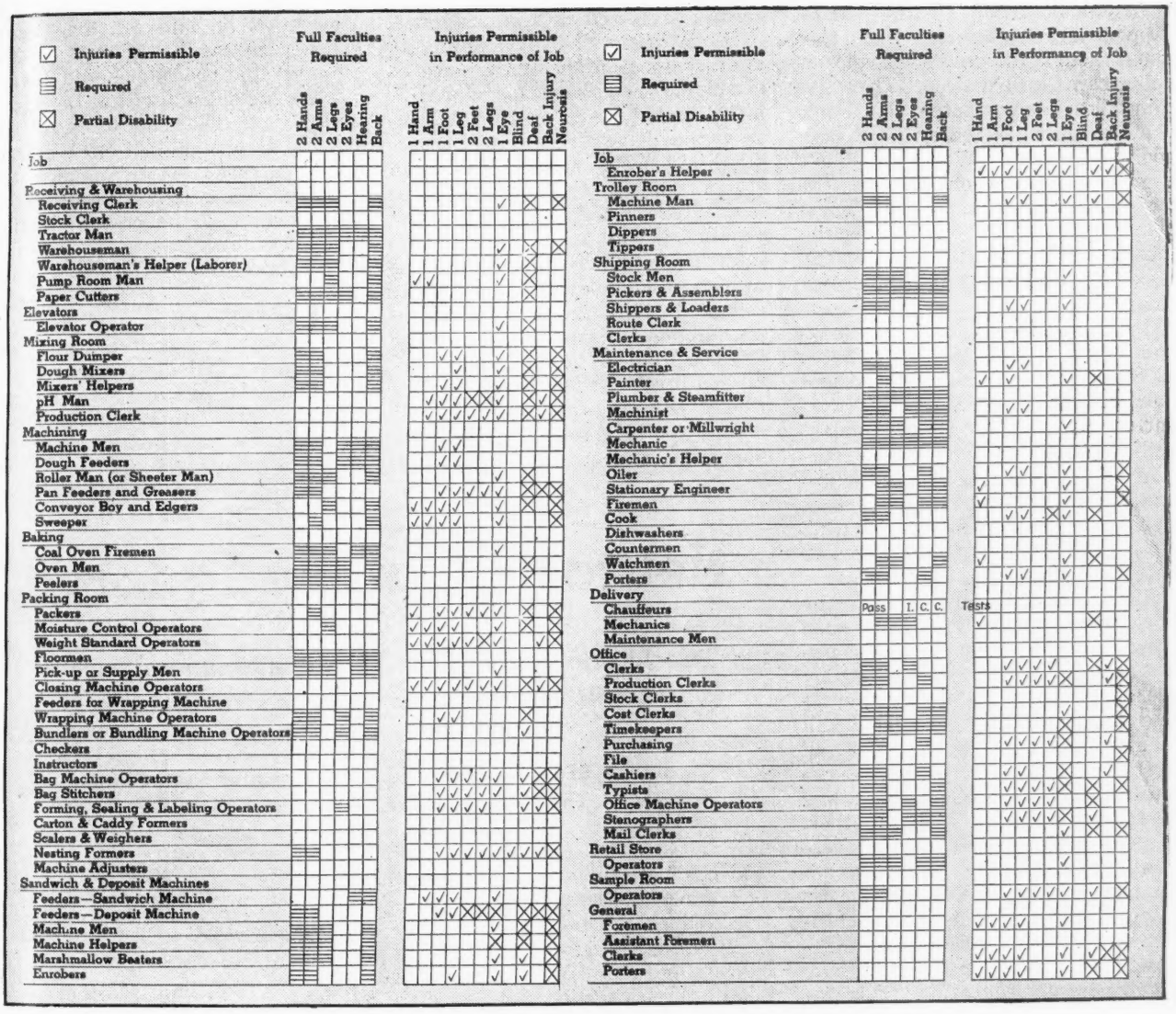
REEMPLOYMENT of war injured veterans has had the earnest consideration of industry from the very beginning of Selective Service. It is the one aspect of the veterans' program in which, above all others, management has shown a determination to find a formula that would go far beyond the legal obligations imposed by the Act.

But the wish to formulate such a plan was not the accomplishment. In the first place the plan had to be economically sound. It had to work for both the employed handicapped veteran and the employing company. The last thing the veteran — and particularly the injured veteran — wants upon his return is charity. He wants to be useful, just as his nonhandicapped fellow employees are useful. He wants to know that he is earning every cent of the salary he is paid. And he wants the same opportunity to become more useful and thus earn the same pay increases that his fellow workers stand the chance of earning.

Plans Develop

At first, all plans for veterans' reemployment were hindered by the uncertainty inherent in the impossibility of foreseeing just what conditions would prevail at the time of demobilization. Gradually, however, appropriate general plans began to take shape, particularly in the food industry. Specific plans, on the other hand, have been a little slower because it was necessary to evaluate hundreds of details before a clear-cut plan could be formulated. It was under such circumstances that the recent company-wide program for the reemployment of handicapped veterans was drawn up by the Loose-Wiles Biscuit Co. For the most part, this is the Sunshine program, taken from 'the written instructions to managers and from personal interviews with Hector Lazo, Director of Public Relations for Loose-Wiles.

A thorough survey of all the jobs available in a bakery the size of the company's New York plant was the first step in the plan's formulation. This revealed what jobs could be performed despite specified handicaps. For instance, a receiving clerk requires both arms and hands, both legs and at least one eye. He could be partially deaf and could be subject to "battle nerves" to a limited degree. The jobs were listed in chart



This is the chart drawn up by Loose-Wiles showing, at a glance, the jobs available and the injuries that may or may not incapacitate the veteran applying for employment.

form showing the full faculties required for each as well as the injuries that would be no bar in performing the job. The chart revealed how very many so-called handicapped persons could actually perform fully and, hence, earn fully, not out of charity, but through intelligent self-interest.

Proper Placing

In distributing these charts to the various plant managers, supervisors and foremen, emphasis was placed on how much, how very much, could be done with proper spirit and proper understanding. It was pointed out that properly placed, handicapped workers are likely to be better workers, more satisfied workers and more serious workers. However, the "properly placed" phase can hardly be overemphasized. In discussing this, Mr. Lazo said:

"Job charts and all other aids and suggestions will mean very little if we don't make sure, at the foreman's level, that every veteran is placed right. There must be frequent and sympathetic follow-ups. If the veteran is found to be genuinely misplaced, we must be sure that an equally sincere effort is made to place him elsewhere.

"Battle casualties are likely to be of several kinds. They need not necessarily be confined to loss of limb or member. In our New York bakery, there are boys who had arm tendons cut by shrapnel and are learning to use the hand all over again. Another had a couple of bullets through his leg, and the severed muscles never will heal completely. Another had his right hand crushed and is slowly regaining the movement of his fingers. These are obvious. But what is not obvious is that in many cases, the boys are nervous, impatient, inclined to expect perhaps more than they get, and likely to resent discipline. Some may offer trouble for many months before they settle down."

Foreman's Responsibility

Regardless of the type of handicap or the disposition of the veteran, however, the foreman must be prepared to help him when he needs help. He must check frequently to see that the work handicapped veterans have undertaken is not beyond their capacity. He must likewise check frequently to see that their disability is not aggravated or intensified as well as to decide when a transfer to some other work will safeguard their health and probably will add also to the safety of the other workers in the plant.

It must be seen to that the handicapped worker is treated properly by all other workers. Specifically, this injunction means:

(*a*) Don't dwell on the handicapped worker's injuries. Don't talk about them at all, unless the veteran volunteers information. Then let him talk while you listen. (*b*) Don't show emotion or tears, or express concern or sorrow. Worse still, don't ever show doubt or disgust. (*c*) Don't ask a lot of unnecessary questions. (*d*) Don't baby or pamper the handicapped veteran. Let him go about his own business in his own way.

It is also a good idea to let everyone in the department know that a careful study of several thousand handicapped veterans in 100 different companies show that handicapped workers (*a*) have an 83 percent lower turnover than the unhandicapped; (*b*) waste 56 percent less time "getting a drink of water," etc.; (*c*) show 24 percent greater output.

There is some danger that the very effort necessary to apply such a program, on a large scale, will create exaggerated interpretations by the best meaning employees, foremen and even managers. This will manifest itself in various ways, all of them tending to dissipate the natural attitude under which one person normally deals with another. We will all go a long way in overcoming this danger, and toward accomplishing the whole objective by placing first emphasis on capabilities rather than disabilities. Likewise, fitting the man to the job may require careful education and training. This is a vital factor that must be handled individually, and not in groups, by resourceful and intelligent foremen.

Veterans Needed

The whole question, therefore, largely revolves itself into one of attitude, which is by far the greatest job confronting management in the reconversion and assimilation of veterans, whether or not they are handicapped. It transcends such problems as finding jobs, clarifying legal status, and adjusting jobs to the physically handicapped. We can all pay lip service to the returning soldier, and make efforts to find some sort of job for him. Or we can intelligently, sincerely and honestly decide that we will reemploy these men, all of them, who are able and willing to work, not out of legal duty, not out of sentiment, but, as the American Legion points out, "because America and American industry cannot do without their courage, skill, and initiative. We must not let their fresh leadership become embittered or disillusioned."

It may be well in concluding to offer a word on the importance of clarifying the veteran's legal status, mentioned above. A great many controversies have already arisen, particularly with regard to union status. Some of the questions have been settled in the courts, others are pending, but all are subject to legal interpretation. If the veteran, as well as the employer, has not fully complied with the legal requirements, the decision is likely to go against him. A very simple illustration involves the returned soldier who takes a four- or five-month rest before applying for his old job. He bumps a nonveteran union member, who must be laid off. The union takes the case to court on the grounds that the veteran did not apply for his old job within the specified 90 days. The court has no choice but to decide against the veteran. Many cases, far more complex, are coming up daily, so a clear and complete record is the best protection the veteran can have.

Such a record, including war service, injuries, illness suffered, etc., likewise will protect the employer against any later controversies that might arise including unwarranted injury claims against the company. These records might well turn out to be a most wise precaution in the years to come.

Neurosis Can Be Ignored

Psychiatric study shows that this emotional upset has little bearing on a veteran's readjustment

By C. CHARLES BURLINGAME, Psychiatrist-in-Chief, The Institute of Living, Hartford, Conn.

WHAT are the practical implication of the term "neuropsychiatric," which has been applied to so many discharged veterans? I am expressing the following opinions as one of three psychiatrists asked to study the effect on industry of the vast numbers of neuropsychiatric cases discharged from the armed forces.

To begin with, the term "psychoneurosis" does not designate a disease in the sense that pneumonia, typhoid or maleria do. It is more a social diagnosis. Briefly, it may be defined as an emotional upset developed to the point where it interferes with the individual's efforts in his employment or with his domestic life or social relationships. Everyone, at one time or another, and in varying degrees, exhibits such symptoms.

The one general conclusion to be drawn from the study is that *we need pay little or no attention to whether or not a man was discharged from the armed forces as a psychoneurotic.* This term as a basis for discharge amounts to nothing more than saying that he did not have the personal traits that would enable him to become a satisfactory member of the Army or the Navy. The inability of a man to adjust himself to military life and conditions does not imply inability to make a satisfactory adjustment to industrial occupations.

It's Skill That Matters

Throughout industry there are thousands of psychoneurotic people succesfully employed. In the past, it may have been found that they were not suited to some particular job, but quite satisfactory in another position. They never were ruled out as undesirable for employment. There is no more reason to look upon the discharged veteran in that light.

I could dwell at length upon the observations upon which these conclusions are based, but one reference will be sufficient. In one large plant, employing tens of thousands of men, returned veterans are being hired without regard to the reasons for their discharge from military service. The sole basis for employment is the veteran's past training and skill. After a period of months of employment, the work record of these veterans was compared with that of nonveteran groups. Nearly one-third of the veterans rated higher in productivity than the average of the entire plant, and a little over one-third had developed higher skills than they had before entering the armed forces.

EDITORIALS

LAURENCE V. BURTON, Editor

Headstrong Organized Labor

IF the demands for 30 percent more wages in the auto industry are a surprise to any one, then that person has not kept abreast of events on the labor-economic front. This publication discussed it on page 95, November, 1944, "The Riddle of High Wages," and since then has continued to refer to the economic problem of the future.

While we have no present answer to how the auto makers can pay the 30 percent wage increase without higher prices, it should be well understood that well-informed business men realize one basic premise in the national economy. High wages make high consumer purchasing power. Low wages make low consuming purchasing power.

Apparently, the current contest is to determine which shall come first, the hen or the egg. UAW-CIO seems determined that high wages shall come first. Business men — even the most liberal — squeezed under OPA price ceilings are disturbed over the abrupt and wholesale change insisted upon by labor. Many believe it would be better to move gradually and experimentally into the excessively high-wage era.

The outcome is not foreseeable, but the UAW-CIO theory must work satisfactorily if the labor views prevail, or else all the CED efforts to create new jobs will have been an enormous waste of effort. It is difficult to envision any other alternatives than:

(1) UAW-CIO gains its astonishing demands, and by some economic miracle the CIO plan really works out. (2) UAW-CIO gains its demands and the whole industry flops and, like Sampson in the temple, pulls down the rest of the economy. (3) UAW-CIO loses its demands, strikes the industry, and thereby vitiates the whole CED effort to create full employment.

Keep the Atomic Bomb Secret

EVEN though we are not aware that any foreign power has made a formal request for full information regarding the atomic bomb or any part thereof too many of our citizenry are shedding crocodile tears over the secrecy surrounding its production.

You are entitled to only one guess as to what power might want the bomb, and only one more guess as to why.

Certainly the United States has no desire to inflict death and destruction on any one except in self-defense. It is incredible that the intellectual processes of anyone reared in this country can reach the conclusion that we shall be in less need for effective self-defense when we give away our weapon. Shall we be more secure if trouble makers are as fully armed as we ourselves? Up to now it has not been noticed that these same sob sisters object to withholding the privilege of making tommy guns from certain difficult elements inside the nation. There seems to be a sort of parallel here.

Our advice is to keep the atomic bomb a secret, and to use it only when a council of nations decides that its use is imperative to save what we fondly regard as civilization.

Don't You Believe It

JAPAN'S former Premier, Prince Konoye, recently assured Americans that after the military clique is removed from power the "Japanese government henceforth will keep its promises." Which hands us a sardonic laugh. A Jap is a Jap, and the truth is not in him if it suits his convenience better. Back in 1919, Wilson & Co. had plenty of Jap run-around from Mitsui & Co. The story would take many pages in its telling. Briefly, however, Wilson had a meritorious claim against Mitsui on a vegetable oil deal. But the offices of Mitsui in San Francisco and New York claimed they knew nothing about it. After months of effort, Wilson finally engineered a setup whereby, if Mitsui did not act promptly, its license to do business in the U. S. A. would be revoked. The San Francisco branch of the Jap firm then settled the claim at once.

There may be some truthful people in Japan, but the liars are not all in the military caste. Prince Konoye is venerable and probably a liberal statesman, but his quoted remark is so much eyewash.

Industry Has 6.1 Percent More Customers

ON August 22, the Census Bureau announced that the population of the United States was 139,682,000. This is an increase of more than 8,000,000 since July 1, 1940. It is only slightly less than the population increase of 8,894,000 in the decade 1930 to 1940.

Our wartime increase omits wartime casualties yet, even allowing for them, the increase alone, from 1940 to 1945, is larger than the total population of a nation like Australia. It will not be long before these new babies become very important consumer markets for processed food. They provide the answer to the current $64 question: Does the food industry of the United States plan any important expansions in the postwar years?

Based on total population figures alone, the need for expansion of production is 6.1 percent. But, in some regions, the expansion need will be considerably larger, in some places much less. It all depends on where the people are. In the years ahead we may be certain of an enlarged market for processed food.

Ion Exchange As a Purifier

A METHOD suggesting considerable application in the field of continuous processes was described in *Industrial and Engineering Chemistry*, July, 1945. R. E. Buck and H. H. Mottern of Eastern Regional Research Laboratory reported on a form of processing of apple sirup to remove malic acid by the ion-exchange process, which seems to warrant high expectations for further applications in the food industry.

Concentrated apple juice of the type of Old Gold's "Something New Has Been Added" is satisfactory as a moisture retaining substance, but as a food it leaves something to be desired. It has a bitter after-taste caused by calcium malate which results from lime treatment of the juice prior to six-fold concentration. The lime treatment, followed by filtration, is the usual method employed in purifying all sugar-containing solutions. But, in the case of apple juice, a part of the lime remains in soluble form as calcium malate, which has the unpleasant after-taste. The investigators sought to remove the malic acid by the ion-exchange method and were successful.

As reported, they were less satisfied by a two-step than by a three-step process in which the juice was successively passed through an anion exchanger, a cation exchanger and then a second anion exchanger. The treatment removed not only the malic acid but much of the spray residue on the unwashed apples, as well as most of the characteristic apple flavor, so that the sirup had only sweetness. The latter can, however, be compensated by the return to the purified sirup of the volatile apple flavors, recovered by another process that has been developed at Eastern Regional Research Laboratory, to produce an apple sirup with a pleasing apple flavor.

So far, the process is still at the stage that would be termed a method or principle. It still remains to be engineered into a commercially successful manufacturing process. Which affords us the opportunity of remarking parenthetically that food technologists must prepare themselves to carry *methods* all the way through to fully engineered *processes*—processes that have sound, economic values in the highly competitive postwar world.

Ion-exchange methods deserve considerable exploration by those who are seeking to improve flavors, remove objectionable metals, or recover from extremely dilute solutions those substances that may have a high value in concentrated form. Limitations, of course, exist as to what may be done. As the name of the process implies, the removable substances must be ionizable; unionized organic substances apparently are not amenable to this form of treatment.

In the fruit juice and sugar fields, the method deserves continued study. As a method of deleading maple sirup, C. O. Willits and C. J. Tressler have reported that maple sap can be reduced in lead content from 36 to 1 p.p.m. Part of the calcium of milk can be removed in this manner to produce a soft-curd milk. What further possibilities ion exchange may hold must be left to further research, but we suggest that the possibility of recovery of rare and obscure constituents of possible high value from waste products should not be overlooked. As Whittemore once remarked, "The most useless thing in the world is something we do not know anything about." We recommend that this comparatively new tool of processing be included in research programs where its use seems to have any applicability.

Wetting Agents for Foods

SOME time early in the war, we advertised in these pages for names of edible wetting agents that were harmless, nearly tasteless or else pleasing to the taste, colorless, nonvolatile and stable. A surprising number of suggestions were sent in. You may find some of them useful in the days to come. Here they are:

Corn sirup	Sucrose
Dextrose	"Duponal PC" (DuPont)
Ethyl alcohol	"Santomerse B" (Monsanto)
Glycerol	"Solvereg" (Solvere Products Co., L. A., Calif.)
Glycol	
Oleic acid	"Vatsol K" (American Cyanamide)
Sodium lactate	
Sodium malate	"Vatsol OT" (American Cyanamide)
Sodium tartrate	

We have not tested them, nor are we able to advise you conclusively as to the edibility of all of them.

For Improved Conveyor Housings

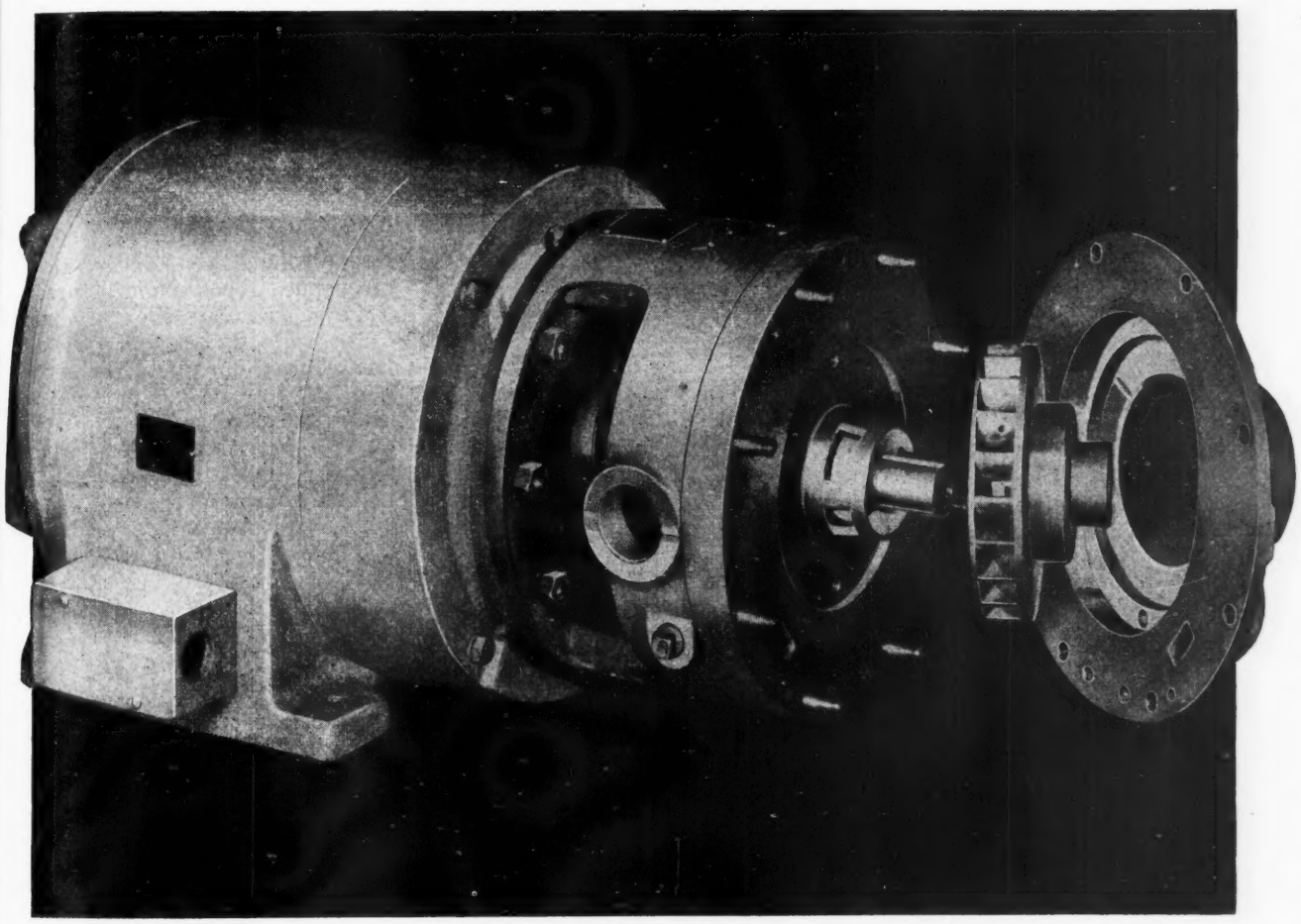
IN considering postwar plant improvements it would be advisable to take a good look at conveyors for powdery and granular food materials, like flour, sugar, cocoa and similar products. A bucket-type elevating conveyor in a smooth housing all painted white may be a thing of beauty from the outside, but what is it like inside after a few months of service?

The place for smooth surfaces is on the inside to avoid places where product may accumulate and be difficult to remove. Too frequently such conveyors are so difficult to open for cleaning that this function is neglected until stoppages occur or insect infestations compel a major effort or a major operation.

This old reliable piece of equipment should be redesigned and rebuilt, if not completely replaced by something better, if its interior condition is always a matter of speculation, rather than exact and daily knowledge. The fault is not in the method of conveying, but in the sort of housing that is put around the conveyor.

As soon as the Food and Drug Administration can replenish its depleted manpower in the inspection division we can look for increased pressure. 'Nuff said.

The Nash Clean-Air Compressor has but one simple moving part.



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

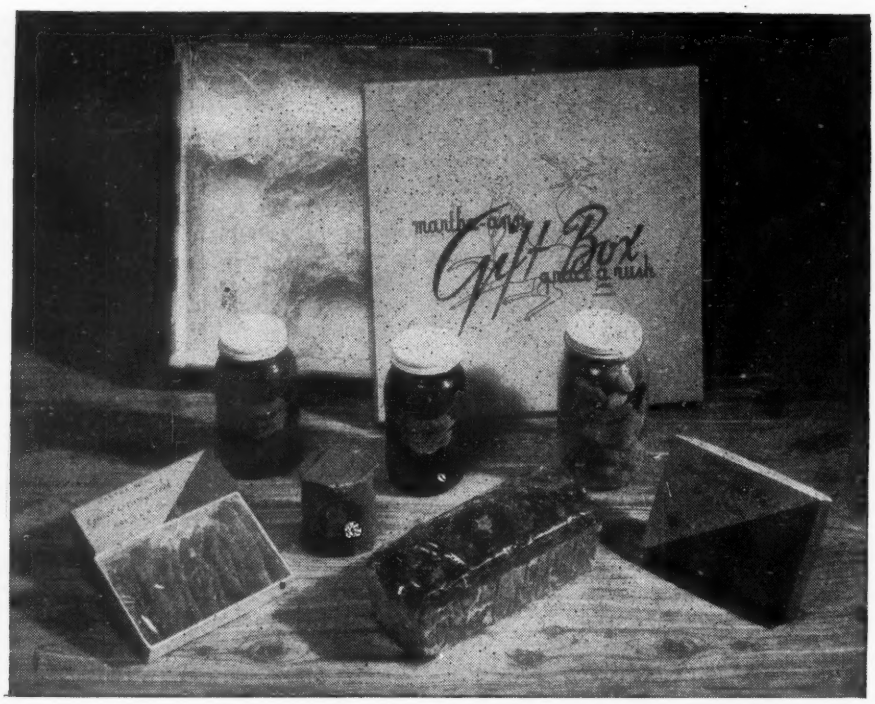
Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

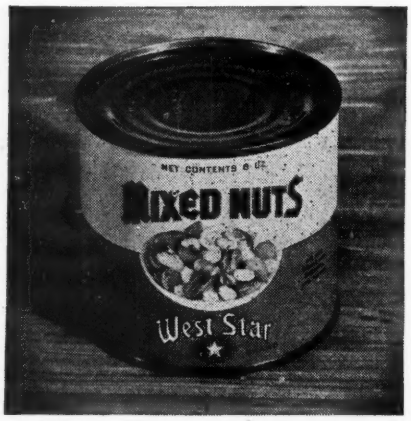


Gift Box

STRIKING design without fussiness is the aim of Grace A. Rush, Inc., Cincinnati, Ohio, in the Martha-Ann junior gift box. This assortment, which is a luxury selection, contains a 1½ lb. Martha-Ann fruit cake, a 4-oz. jar of brandy hard sauce, 8-oz. packages of glacé orange and grapefruit peels, together with jars of spiced toasted almonds, marmalade and a grape and walnut conserve, or some other conserve selected from the regular production. The design of the package for the peels has been changed to conform to the outer box, but the other products are labeled as before.

Details of the individual packages are carefully planned. For instance, the peel, in strips just long enough to lie across the box, is protected by a heat sealed cellophane wrap under the paper covered box top. The fruit cake, in a paper shell and covered with cellophane, has the surface left rough, then glazed in baking.

Chartreuse and dubonnet stripes on the box body contrast with a plain chartreuse cover highlighted with blue and purple. The small packages for peel repeat the color scheme, while the hard sauce jar is wrapped in dubonnet paper. A very high glaze on the paper adds to the holiday air, and incidentally makes the package much less subject to soiling through dust or handling.



Fresh Roasted Nuts

MIXED NUTS — peanuts, filberts, almonds, pecans and cashews — are offered by The L. Demartini Co., San Francisco, Calif., in a gay red and white lithographed can with lacquered black metal ends. The West Star Brand nuts are roasted in vegetable oil and salted before being vacuum packed. The can holds 8 oz.

Quick Fudge

ONLY available in New York and Chicago at the present time, Tootsie Home Made Chocolate Flavor Fudge mix is manufactured by The Sweets Co. of America, Inc., Hoboken, N. J. No wider distribution will be undertaken until the supply situation improves.

The mix contains sugar, corn sirup solids and dextrose, cocoa, skim milk powder, salt and artificial flavor. The 14-oz. package will produce 1-lb. of creamy fudge, the added ingredients being water and a small amount of butter or other shortening. Cooking takes only three or four minutes, according to the directions on the unusual chocolate, blue and yellow carton.

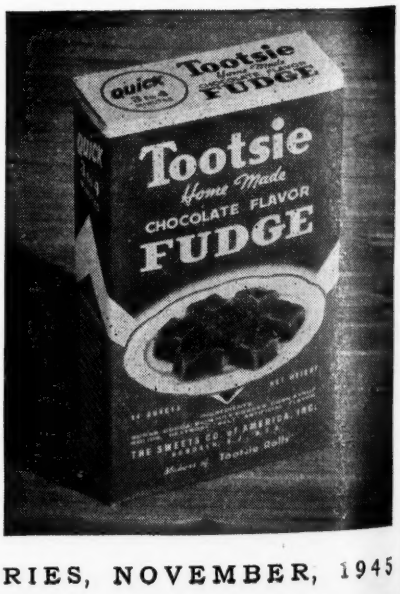
Easy Desserts

PEACHES have been added to the list of chopped foods manufactured by Gerber Products Co., Fremont, Mich., while squash and apricot-farina are new in the strained foods list. The apricot-farina is of particular interest, because while apricots are nutritionally desirable, the straight apricot puree tends to a marked sharpness of flavor. The farina overcomes this difficulty and adds both body and nutritive value to the product. Gerber's now offers ten fruit and dessert products.

Smooth and Sweet

PLENTOSE contributes both stabilizing and sweetening effects in an ice cream mix, according to the manufacturer, Malt-A-Plenty, Inc., Tulsa, Okla. To achieve this, wheat starch in an aqueous solution is subjected to enzymatic conversion. The resultant mixture of simple sugars, dextrins and miscellaneous products is spray dried, giving a fine white powder which goes into solution readily.

The sweetening power is about



half that of cane sugar. The stabilizing effect is such that when 2 to 4 percent is added to an ice cream mix using gelatine as a stabilizer, the latter can be reduced to about 0.2 percent. Improvement in both body and texture results with no difficulty in homogenizing.

At present distribution is in bulk only, in 225-lb. barrels.

Somewhat Smoky

APPETIZERS and sandwiches are suggested uses for Queets Barbecued Salmon. It should, however, find wider application.

The salmon is smoked, then several pieces without bone are packed with a small amount of cottonseed,

soya or salmon oil. Some salt is added. Processing is regulated so that the product is firm but not dry. The flavor is distinctly smoky.

Dungness Crab, Inc., Seattle, Wash., reports that although this has only recently been put on the market, it is the result of several years of experimentation.

The 6½-oz. net weight pack is in a "½ flat" enameled can, bearing a full-color lithographed paper label.

Creole Style

TOMATO PASTE forms the base of White Rose Sauce Nicola, a new and well-seasoned addition to the products distributed by Seeman Brothers, Inc., New York. This creole-style sauce has its onions and peppers in pieces large enough to give character. It also contains beef fat, along with the sugar, salt and spices. Water is added to make a sauce of moderate thickness.

Game Fish

BLUE MARLIN, known to a large part of the country only in pictures sent back by deep sea fishermen on West Coast vacations, has now assumed a less glamorous role. Canned in brine,

it is being distributed by John Thallon & Co., Inc., New York, under its Jaytee brand.

The distributors believe that this is the first time blue marlin has been canned successfully.

The firm, pinkish-fleshed fish is packed in a No. 1 standard can (drained weight, 9 oz.). The paper label is in four colors on white.

Creamy Sherbet

NONFAT dry milk solids are used in a new mix for a frozen dessert. Sugar and vegetable stabilizers are the other ingredients, with the addition of vanilla and vanillin. Addition of water makes a milk sherbet, but milk or cream can be used as the

liquid to prepare a richer dessert. Chocolate, coffee or fruits can be used to vary the flavor.

Dairymen's League Co-operative Association manufactures Tissert under an exclusive license. It is distributed by Homix Products, Inc., New York.

Packaging is similar to that of the same distributor's Tis ice cream powder, 4-oz. in a heat sealed waxed bag being enclosed in a simple folding carton. The label design uses muted blue and red against a yellow and white background.

No More $TONE$ in Your Bottle-Neck!

• Now, with critical war shortage of labor, streamline STONING in your mill. Removing stones has always been slow, laborious and costly out of proportion to other steps in processing cereals, soy beans, and other dry foods. To eliminate this great headache of the cereal and other dry food processors, we have developed a new type stoner—revolutionary in design, amazing in efficiency, low in first cost, in operation. Removes stones, glass, non-magnetic metals, and all other hard, dangerous contaminations from cereals, soybeans, and other beans, and other food products with, 1) an action so sensitive the tiniest particles are easily removed; and 2) operating cost so low it is relatively insignificant; and 3) 99.9% efficiency. Capacity up to 16 tons per hour.

Write for Bulletin FI-1045

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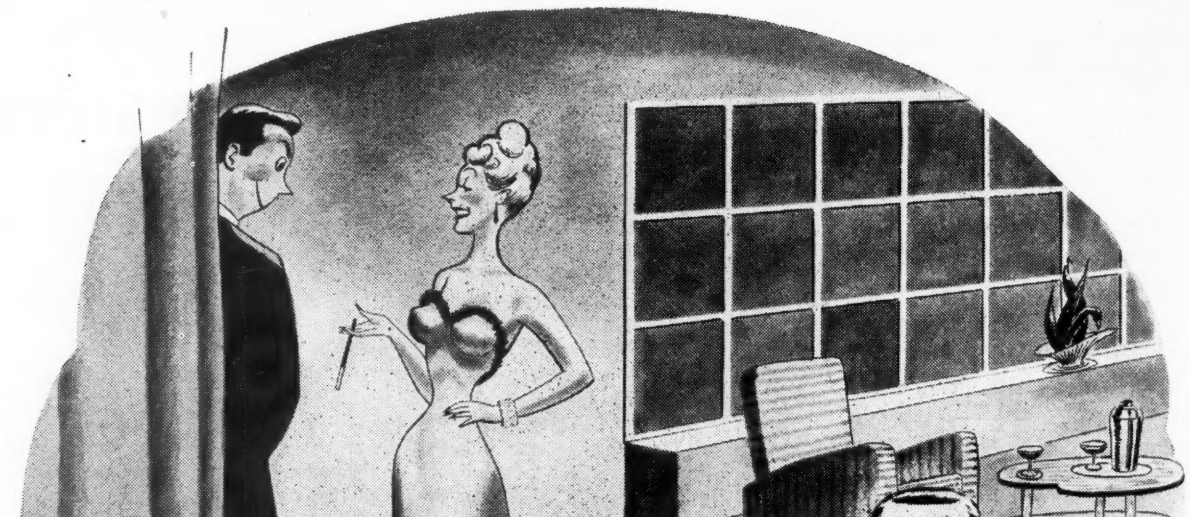
In Canada—Kip Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign—Separations Engineering, Ltd., 133 Bush House, Aldwych, London



"Deep breathing might have something to do with it"

SURPRISINGLY enough, people bring similarly tidy problems to us. As when a manufacturer of calcium hypochlorite had difficulty packaging his product.

This chemical is unstable, corrosive, sensitive to moisture, and is required to be packaged in resealable cans. This presented a packaging problem for which no satisfactory container had been developed. Could we fix?

Well, we could try . . . Yep, we came through—by designing the "breather can"—a moisture-repellent container which incorporated means for the gases to "breathe," and a lacquer to retard chemical action.

"Cangenuity," our ability to combine ingenuity with can-making experience, is one of the many ways you profit when you deal with Crown. And it's a good place to start. If you have packaging trouble, tell us your symptoms.

CROWN CAN

INDEPENDENT AND HELPFUL

CROWN CAN COMPANY • NEW YORK • PHILADELPHIA • Division of Crown Cork and Seal Company, Baltimore, Maryland

FOOD INDUSTRY NEWS

GENERAL

USDA Sees Tight World Food Supply Following Low Farm Production

The per capita decrease in farm output amounts to about 10 percent when world increase in population is considered

A SERIOUS tightening of the general world food supply, in 1945-46, is forecast by the Office of Foreign Agricultural Relations, U. S. Department of Agriculture, in a report issued October 1.

The forecast is based on the lowered farm production, the sharply reduced carryover stocks of all major food products, and the disrupted collection and distribution that are revealed in a worldwide survey, as of about September 1. While total farm output is found to be only about 3 percent less than the 1935-39 average, in terms of calories, it amounts to a per capita decrease of about 10 percent, when allowance is made for the net increase in world population. North Africa and Continental Europe, excluding the U.S.S.R., show the greatest decline. Widespread drought and the continuing effects of war's disruption have reduced the prospect by about 15 percent of 1944-45 production, and possibly 25 percent below the prewar average. Japan may also experience a drop of similar proportions, although India and China should equal their prewar average. The U.S.S.R. production will increase over a year ago, but will still be considerably under the prewar average.

North and South America are the only major areas where production this year will be much above the prewar levels. While production in North America is slightly below a year ago, it will be about 33 percent above the prewar output. Prospects in South America, where the seasons are in reverse, are somewhat better than a year ago when extensive droughts reduced food production to about 7 percent above the 1945-39 average. In 1943-44 South American production was 25 percent above that average.

Of the major commodities, sugar will be about 13 percent below the prewar average, although slightly larger than last year. Supplies of fats and oils, while continuing at low levels, should be increased some by the liberation of the surplus vegetable oil producing areas of the East Indies and Manchuria. Little change in total production of meat can be expected, as anticipated increases in New Zealand and Argentina will be offset by decreases in Canada and Australia. Fish supplies are also below prewar levels, although the catch in the world's fisheries has been increasing since the war's end.

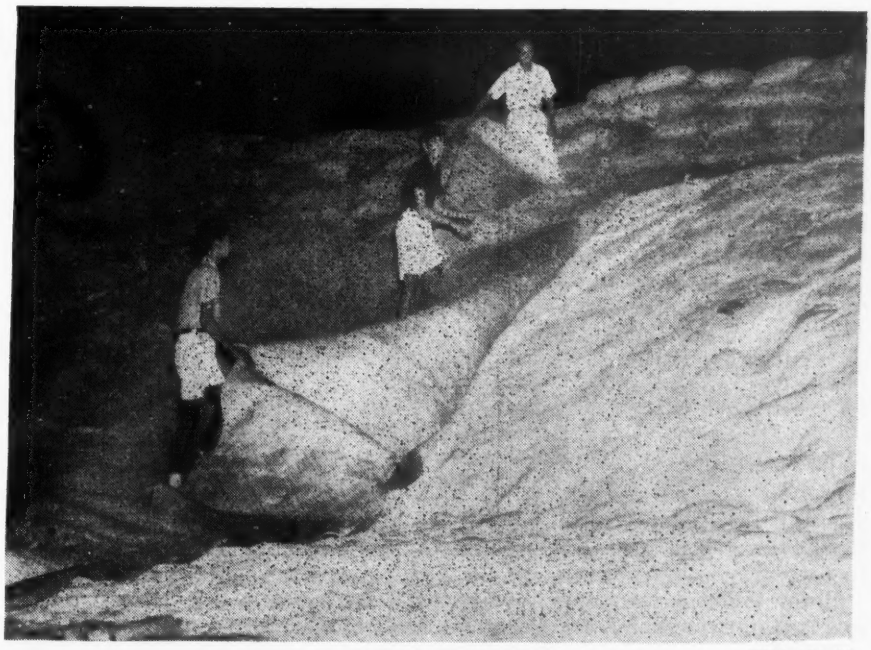
World milk production will be about 5 percent less than prewar because of the sharp decline in European production. The production of fluid milk and the manufacture of dairy products other than butter, however, will be above the average due to the sharp reduction in butter output. Egg production has risen sharply in the U.S. and Canada, during the war, but in Europe, the production of pultry and eggs has suffered a greater decline than that of any other major food product.

Standard Brands Gives Ten Food Fellowships

IN an effort to help the food and nutrition industry overcome the war-enforced lag in research, Standard Brands, Inc., announced the granting of fellowships in ten universities.

The fellowships are on a five-year grant, and have been offered to the following universities: Cornell, Harvard, Indiana, Massachusetts Institute of Technology, Pittsburgh, Princeton, Rutgers, Stanford, Wisconsin, and Yale.

In announcing these awards, J. L. Bogert, vice president, research and development, said: "The purpose of Standard Brands' fellowship plan is to encourage young men of scientific ability to equip themselves to do research in the fields of food and nutrition. The war has caused a



Wide World

THAT JAVA SUGAR FIND

Even official government optimism is fading over the 1,600,000 ton sugar "find" in Java. Political troubles on the island are said to have dampened the prospects of getting any immediate action on delivery. The food industry has been skeptical from the start because of shipping and other difficulties that were seen to be standing in the way of substantial U. S. distribution of the sugar.

large number of able college students in technical courses to give up their studies. The result is the threat of a shortage of research scientists, graduating during the next few years—a serious situation, in a period when the country will need the utmost effort in technological development."

"In making these fellowships available at this time," Mr. Bogert added, "Standard Brands is undertaking to do what it can to maintain America's scientific leadership. The progress that the food industry makes in the years ahead will be in the direct proportion to the number of first class research men engaged in this field."

The students selected for these fellowships will be chosen by the universities specified. Their selection and their work will be entirely free of any influence by Standard Brands, Mr. Bogert said, since the purpose of the fellowships is to advance the entire industry in any way possible. The fellowships will include advance studies in Bacteriology, Organic Chemistry, Chemical Engineering, Biology, or Food Technology, Biochemistry, and Microbiology, and may be expanded to cover any other phase of the industry if the need arises.

NO CUTBACKS HERE

These grownup tricycles have to be used on inspection operations in the Loose-Wiles Oakland, Calif., plant, which covers five city blocks. And now the company announces a $1,000,000 expansion program that will almost double the plant's capacity and add about 120,000 sq. ft. The company also announces plans for a "seven block long" plant in Kansas City.

Wage Raise Hazardous In Canning Industry

THE canning industry differs, in many respects, from most of the industries discussed by President Truman in outlining his wage-price policy, declared Carlos Campbell, secretary of the National Canners Association, in an address before the Michigan Canners Association, on November 6. Throughout the war, Mr. Campbell pointed out, canners produced approximately the same items they packed prewar and will continue to manufacture in peacetime. Furthermore the volume reached an all-time peak during the war. Thus, in the canning industry, the unit costs cannot be reduced by stepping up the volume of production, and there is consequently no hope of increasing wages from a fund drived from such a savings in cost.

Referring to the economic factors involved in the manufacturing process, the canners' secretary reminded his audience that the total value of the contributions made by labor, management and capital is determined by what the buyer is willing to pay for the finished product. Under a controlled economy this total value is determined by the permitted maximum, or ceiling price. In either case calculation must be made as to the proportionate values contributed by labor, by management, and by capital. But in making the dollar distribution that should be based on these calculations, management must measure labor's share before the amount to be distributed can be known.

No method has ever been devised for measuring the exact portion of the physical output of a plant that is attributable to the productivity of labor. As a result, a fair wage is rarely achieved. If the wage is too high, capital is deprived of a just return and will cease to support that industry. If it is too low, labor is dissatisfied and productivity suffers.

Obviously, therefore, a sound basis for determining a fair wage rate is for both labor and management to make that rate a fair compensation for the productivity of the worker. They should strive to find a practical method of evaluating the worth of this productivity rather than expend effort trying to build up bargaining power that will lead only to exploitation of one or the other.

In the war period, invested capital in the canning industry increased at approximately the same ratio as the increase in packs, according to a recent OPA finding, Mr. Campbell continued. Much of this increase served to increase the productivity of labor, and has already been passed on to labor in the form of higher wages. Unless the efficiency of cannery labor can be increased there is no basis for boosting wages without raising consumer prices.

President Truman said he recognized that, in some instances, such would be the case. Consequently he issued Executive Order 9651, which amends Executive Order 9599, issued last August 18. It provides that the Stabilization Administrator shall approve wage increases falling into any of the following three classes:

1. Where the percentage increase of straight-time hourly earnings, since January, 1941, has not been as great as the increase in the cost of living.

2. Increases to correct inequities among plants in the same industry or locality.

3. Increases to recruit needed manpower to insure full production, when designated by the Administrator as essential to reconversion.

In the final analysis, concluded Mr. Campbell, the policy means that the canning industry is to absorb any and all wage increases to the full extent of its ability and that the ability to absorb increased labor costs will be determined by OPA according to OPA standards. This will continue, he added, just so long as there is a government control of industry.

Poultry Canners Form Institute for Postwar

RECOGNIZING the need for cooperation in solving the many technical and merchandising problems involved in converting the nation's poultry canning plants from military to civilian production, the industry has formed the National Poultry Canners Institute, Inc.

Formal organization of the Institute was announced by John T. Christian, president of Christian & Co., Inc., Pittsburgh, who was elected president of the trade group at a Washington meeting of poultry

FOR A PILOT PLANT OR A PRODUCTION INSTALLATION

CUSTOMER TO ALLOY SALES MANAGER:

"This job requires a muffle which will stand up under temperatures up to 1800 without failure or distortion."

ALLOY CHIEF ENGINEER TO DESIGNER:

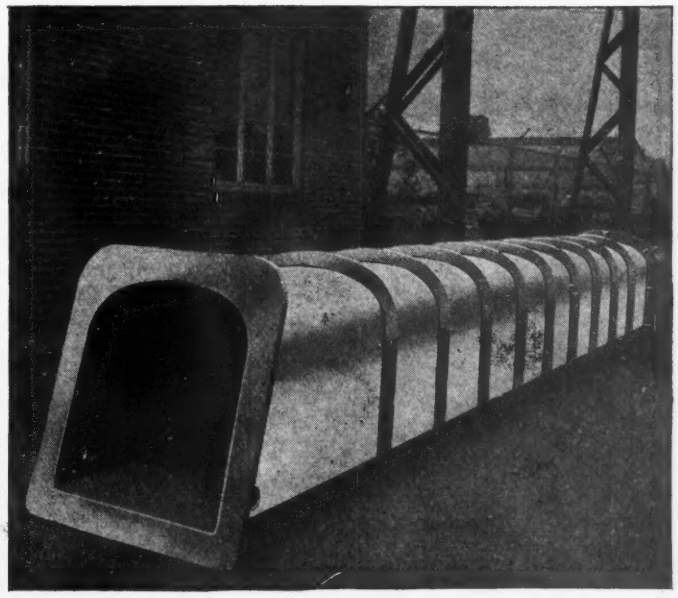
"Specify 25-20 Chrome Nickel (type 310). It will resist oxidation at this high temperature. The muffle should be arched at the top and the flat sides reinforced with bands."

ALLOY WELDING SUPERINTENDENT TO FOREMAN:

"We will butt-weld the bottom to the sides and top and eliminate corner welds; provide generous radii at all intersections for expansion."

ALLOY FOREMAN TO WELDER:

"Keep your welds uniform to avoid distortion while welding and for the later operating temperatures; stitch weld stiffening bars to permit 'breathing' of the muffle."



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DIVISION OF THE ROBINSON FOUNDATION, INC.

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HEART OF HIGH VACUUM SYSTEMS

- Higher Vacuum (in the low micron range)
- High volumetric efficiency
- Low power requirement
- Complete discharge of air — no re-expansion
- Continuous dehydration of oil — no moisture to re-evaporate
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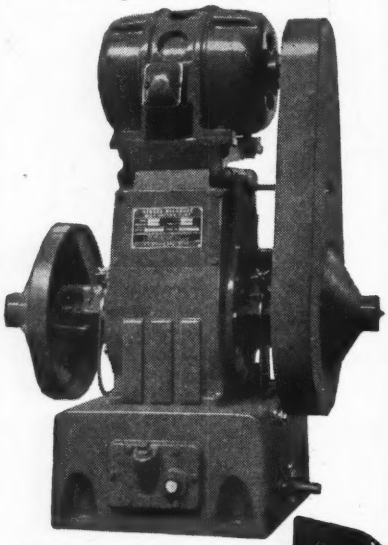
- Rugged, compact, simple construction
- Long life . . . negligible maintenance
- Five sizes — from 10 to 235 cu. ft. per min.



Stokes VACUUM GAUGES
(Patented McLeod Type)
Are Always Accurate

- Require no calibration
- Rapid readings
- Simple to operate — just tip and read
- Two models — (AA) — 0 to 5000 microns (BB) — 0 to 700 microns, with readings to 1/10 micron.

F. J. STOKES MACHINE CO.
5976 Tabor Road Phila. 20, Pa.

Stokes *High Vacuum*
PUMPS · GAUGES · EQUIPMENT

canners, during September. The action taken at the conference followed a preorganizational meeting of the industry at French Lick, Ind., in July.

In a statement outlining the immediate and long-range objectives of the Institute, Mr. Christian stated that the majority of poultry canners, who have been producing for the armed forces almost exclusively during the past four years, realize the necessity of recapturing civilian markets which have been necessarily neglected during the war.

Jap Food Industry On Casualty List

THE Japanese food industry, in general, was seriously damaged during the war, according to a brief survey recently forwarded from that country. Reconstruction, under the American occupation, has already begun, but the industry is still a long way from prewar production. This is especially true of wheat flour milling, "shoyu" or soybean processing, "miso" or bean paste production and beer output.

Flour production is said to have been cut 60 percent during the war. The large flour mills, such as Nisshin Nippon, Nitto and Masuda, were seriously damaged by air raids. Mills in the mountainous areas remained undamaged, but their capacities are small, the combined production not approaching the output of the big mills. Installation of reserve machinery and importation of wheat from Australia offers the brightest hope for the immediate future. Beyond the immediate future, the milling industry will depend upon wild grasses, fruits, potato runners and starch drags for raw materials in flour production.

Because the miso industry was largely hand operated, the plants were concentrated in the cities and were thus seriously damaged. Recovery, however, should be rapid since little machinery is involved. A great deal depends upon plans already made by the government to supply salt and soybeans, the industry's essential raw materials. For the present, shipments of Manchurian soybeans and foreign salt have been stopped.

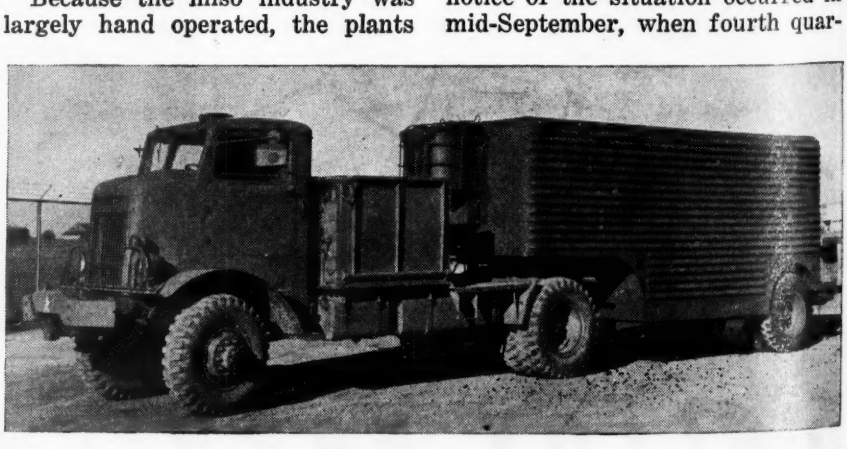
The shoyu industry faces a serious problem in obtaining raw materials because salt and soybeans are to be supplied to the miso industry. For the present the internal demand can be met from stocks on hand, but this reserve will be exhausted by next July. It is hoped that some methods will be devised to produce shoyu through substitute raw materials, such as aminosan, fish juice, chrysalis and sea weeds.

Damage to the canning industry was two-fold: Even before the air raids brought a great deal of destruction, output had been greatly restricted because of the lack of tin. Reconstruction of this branch of the food industry will be long delayed because there is little demand for canned foods either for export or reserve.

The brewing industry forms the one bright spot in the whole Jap food manufacturing outlook. Plants were only slightly damaged by bombs and beer production should be as rapid as the Allied forces permit.

Fats and Oils Supply Seen Much Improved

TERMINATION of orders controlling distribution and use of five industrial fats and oils is a reflection of the easier position of both edible and inedible supplies. First official notice of the situation occurred in mid-September, when fourth quar-



REFRIGERATED TRAILER

This imposing vehicle is an experimental refrigerated trailer built for the U. S. Army It was designed on aeronautical engineering principles and built of aluminum alloys, weighing only half as much as the standard refrigerated trailer now used by the Army.

Front and back . . . a really sweet Mack!

In back she's got a real sweet trailer—that carries 25,000 pounds of honey.

And in front she's got a honey of a tractor—a Mack!

The man who knows her best—her driver—swears by this Mack, after driving competitive makes for many years.

The gross weight of this unit is 40,000 pounds. The Sioux Honey Association—world's largest honey packers—distributes their products in Iowa, Nebraska, Missouri, and South Dakota, and markets it under such famous brand names as Sioux Bee Honey, 3 Bees Honey and Clover Maid Honey.

★ BUY THAT EXTRA VICTORY BOND TODAY ★

Mack Trucks, Inc., Empire State Building, New York, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N.Y. Factory branches and dealers in all principal cities.

Mack
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

Performance Counts

NOW!

A NEW and IMPROVED FA WRAPPING MACHINE

If you are determined on getting the latest and most advanced wrapping machinery, you will find that Package Machinery Company engineers have anticipated your wishes to an outstanding degree.

The new and improved FA model is a good example. Long the most widely used wrapping machine in the packaging field, the FA has been given many new features that will contribute importantly to faster production and better packaging.

Here's a machine that is adaptable to many styles of wrapping. It not only wraps cartons, but flat objects on a card, loose pieces in a boat, banded goods such as paper envelopes, etc. And it is adaptable to practically any type of material.

New features include:

Vertical paper slackener that saves floor space . . . Glue pots that are easier to keep clean and which accommodate the full size range of the machine without alteration . . . New spring floating heater units of greater wattage . . . New transport mechanism that permits shorter discharge belts . . . Improved folding box which makes it easier to adapt an existing machine to a new package size. And it is more rugged and quieter in operation than ever.

Write for Bulletin on the New FA

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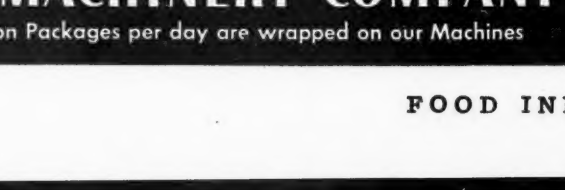
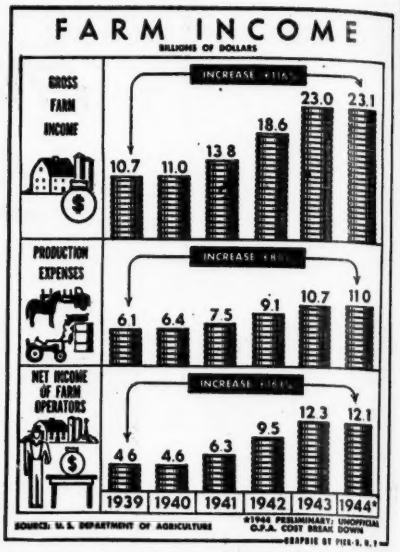


A single FA-4 machine wraps this wide assortment of cracker cartons

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines



BIG BUSINESS

With a rise in net income from $4,600,000,000 in 1939 to $12,100,000,000 in 1944, the U. S. farmer is very much in the national economic picture on all postwar plans.

ter quotas for shortening, cooking and salad oils were increased to 88 percent, and later on by the emergency allocation of an additional 4 percent. In mid-October, the lard allocation was increased from 319,500,000 to 430,000,000 lb., and margarine from 89,200,000 to 112,300,000 lb.

At the time the fourth quarter quotas were announced, Secretary of Agriculture Anderson expressed the belief that rationing of shortening and cooking oils could be abandoned after the first of the year. While this will be done, in all probability, it appears as if the orders controlling edible fats and oils will be kept on the books for some time in standby condition in case of an emergency.

Complete cancellation will come when oils from the tropics plus domestic production are sufficient to meet domestic requirements—possibly a year hence.

Restrictions on industrial uses are expected to be removed gradually, with the market open to free sales quite soon. The exception to complete abandonment of all control measures is the possible retention of inventory controls to prevent hoarding.

The emergency 4 percent increase in the fourth quarter quotas of fats and oils for shortening, cooking and salad oils is made possible in part by the 80,000,000 lb. of butter released by the Army. The prospects for a big corn crop and an equally satisfactory hog crop takes much of the gamble out of the recent relaxation. As the future supply picture

Skill-

The Essence of Perfection

IN EVERY FIELD, from fly fishing to metal fabrication, skill is the essence of perfection. Particularly is that true in manufacturing products of stainless steel or similar high temperature alloys. They're difficult metals to work and many times inferior substitutes are used for this very reason.

If certain parts or your entire product can be built better with stainless, sub-contract this work to Solar. This company for the past fifteen years has been the industry's leader in engineering, designing and manufacturing heat and corrosion resistant products.

A letter addressed to "Service Department" will put you in contact with the men who, during the war, produced exhaust systems, heat exchangers, jet engine parts and many other products for the country's leading airplane manufacturers.

ARMY ★ ★ ARMY (E) ★ ★ NAVY

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He's Doing the Work that Dozens Did

HIGHWAY TRANSPORT . . . VITAL TO VICTORY AND THE AMERICAN WAY OF LIFE

In Napoleon's time, it took *nineteen* farm workers to supply food for *one* person off the farm. Today, *one* farm worker feeds *four* hungry soldiers, sailors, or civilians. Early in the last Century, it required *sixty-four* hours of work to produce an acre of wheat. Now it can be done in less than *two and a half hours.*

This means that the record farm crops produced in World War II have been grown and harvested by 26 million fewer persons than would have been required if early 1800 methods were still in use.

Today's farmer is *Doing the Work that Dozens Did* largely because of modern, scientific methods and motor-powered equipment. Nearly 35% of the nation's trucks are used in agriculture. Over a million and a half strong, they save incalculable amounts of time and labor, both on the farm and between farm and market!

NEW GMCs . . . ½ TO 20 TONS NOW AVAILABLE

GMC, builder of nearly 600,000 military vehicles, has now turned its full production facilities to the manufacture of commercial vehicles. Civilian GMC trucks are powered by engines of the same basic design as the famous "270" used in the GMC "six-by-six"... the Army "Workhorse."

INVEST IN VICTORY . . . *BUY VICTORY BONDS*

GMC TRUCK & COACH DIVISION

General Motors Corporation

Pontiac, Michigan

HOME OF COMMERCIAL GMC TRUCKS AND GM COACHES . . .
VOLUME PRODUCER OF GMC ARMY TRUCKS AND AMPHIBIAN "DUCKS"

becomes clearer, Washington officials believe larger quantities may be allocated to industrial and civilian uses without danger.

The world fats and oils picture is expected to change rapidly for the better after the first of the year. Government officials explain that the seasonal increase in the slaughter of hogs which will begin soon, together with an improvement of the supply of tropical oils from the Far East as a result of the liberation of producing areas from enemy domination and the improved shipping situation will ease the situation materially. Behind all of this, however, is the knowledge that some producing countries, particularly in South America, have been holding back supplies in the hope that the price structure in this country will break and that they can receive higher prices for their products. When it is definitely established that higher prices cannot be hoped for, large quantities of fats and oils now being held back will come on to the market at the current price. Some Washington officials point out the similarity in the behavior pattern of suppliers in World War I and World War II.

DISTRIBUTION

Heavy Supply of Beef Seems in the Making

ACTIONS recently taken by various Federal agencies indicate official belief than an unusually heavy movement of meat animals is expected. The seasonal run of beef cattle which is just starting was still of undetermined proportions in mid-October. That the country might be inundated by a flood of beef was indicated when Secretary Anderson announced the possible early end of meat rationing. This belief was bolstered by making the lower grades of beef point-free for the rationing period beginning Sept. 30. The increase in supplies which made the cut possible resulted from the seasonal increase in the marketing of range-fed cattle, according to a statement by Chester Bowles.

The cautious approach to the suspension of control over the use of cold storage warehouse space indicates preparation for a possible emergency. The warehouse space must be in readiness to take any meat not immediately absorbed by the market. Overall occupancy figures indicate adequate space, but area checks show that there are many localities where cold storage warehouses are uncomfortably full.

1,415,853,000,000
CUBIC FEET OF GAS

*used industrially and commercially in year**

Prove

The Trend is Definitely to GAS

FOR over thirty years, the records show there has been an increasing trend to Gas for all industrial and commercial heat requirements. The last ten years have been most spectacular, use of Gas in these fields having doubled. The twelve months ending June 30, 1945 saw the staggering figure of ***one trillion, four hundred fifteen billion, eight hundred fifty-three million cubic feet of Gas*** consumed by industrial and business establishments.

Nor was this due to war demand alone, for a large percentage of this ten year growth was attained before hostilities opened. Reasons for this wide acceptance of Gas by production managers and executives is seen in the merits of this modern fuel and the great advances made in scientifically designed Gas equipment.

The characteristics of Gas that make it so desirable to industry and business include its speed, economy in unit and overall costs, its precise automatic control, its cleanliness and dependability.

The story of the many advantages of Gas and the data on the specific type of heat transfer equipment that will do the best job for you is available from the Industrial Engineer of your local Gas Company, liaison man between America's far flung Gas Industry and you.

For 12 months ending June 30, 1945. Figures do not include Natural Gas sold for generation of electricity.

AMERICAN GAS ASSOCIATION
Industrial and Commercial Gas Section
420 Lexington Avenue, New York 17, N. Y.

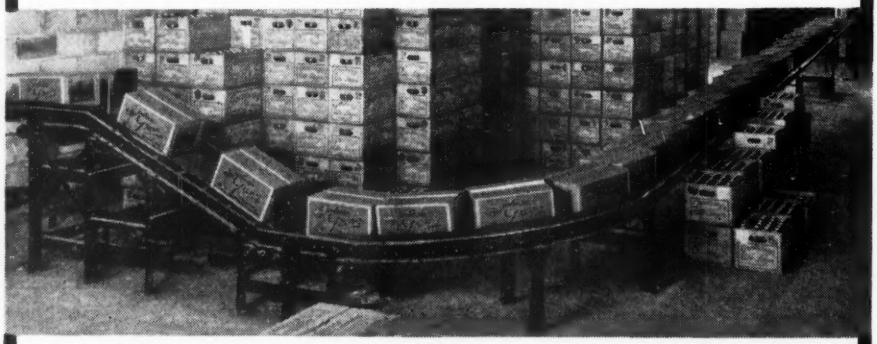
THE TREND IS TO GAS
FOR ALL
HEAT PROCESSING OF FOODS

Cut Materials-Handling Costs . . .

- Unloading and loading freight cars, ships and trucks
- Routing material and packaged products in processing plants
- Warehouse receiving, storage and delivery

One man can unload a truck quicker, and with less fatigue, when he uses a lightweight portable gravity conveyor.

● The LAMSON LIGHTWEIGHT PORTABLE GRAVITY CONVEYOR can be set up quickly to expedite the unloading or loading of freight, and deliver freight to or from any section of warehouse or dock storage. Strong and stable, adaptable to inclines and curves. In warehouse receiving and delivery it affords more road-time for fleet and delivery trucks.



Packaged merchandise is carried from basement storage and delivered to shipping department as required, over Lamson Roller Gravity and Belt Conveyors.

● LAMSON ROLLER CONVEYORS are saving time and cutting costs in many food plants throughout the country. Adaptable to handling all types and kinds of containers. Installations in new or old buildings soon pay for themselves and increase plant earnings.

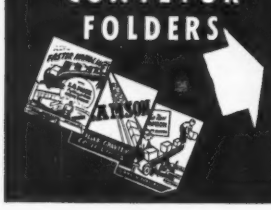
Tiering with a Lamson Utility Conveyor. Adjustable to various angles.

LAMSON UTILITY CONVEYORS can be used anywhere for loading, unloading and tiering. Serves as an auxiliary to portable or built-in plant conveyor systems.

Lamson, an organization of materials-handling engineers, invites consultation on special handling problems. Field engineers are available without cost or obligation to your company.

LAMSON CORPORATION
SYRACUSE 1, N. Y.

Write for
DESCRIPTIVE CONVEYOR FOLDERS



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Gentlemen: Please mail folder or folders on:
( ) Lightweight Portable Gravity Conveyors
( ) Roller Gravity Conveyors ( ) Utility Conveyors

Name.....Title.....

Company.....

Street.....

City and Zone.....State.....

These are along the Atlantic Seaboard, at some of the ports on the West Coast, in the Southeastern states where there are few cold storage facilities, and even in some of the interior cities.

The mid-October allowance of an increased markup for deliveries from War Shipping Administration stocks of beef cuts and veal carcasses to shipside by licensed ship suppliers is considered a part of the general plan. The official announcement of the price increase stated that it was made "to assist in speeding disposal of beef cuts and veal carcasses stored in government 'stockpiles' under the direction of the War Shipping Administration." The WSA also issued a temporary order prohibiting vessels under its direction from buying fabricated beef cuts and veal carcasses unless they came from that agency's stockpiles.

Simultaneously with making the lower grades of beef ration-free, the Department of Agriculture announced set-aside percentages for federally inspected slaughterers which went into effect October 14. The official reason for this was "to assist the Production and Marketing Administration on procuring the kinds of meat, mostly of the lower grades, required for export, principally to Great Britain, France, Holland and Belgium."

Occupancy figures of commercial cold storage warehouses will accurately reflect the meat situation. Trouble may be expected if occupancy of freezer space goes above 85 percent and if cooler space goes above 75 to 80 percent.

On October 1 freezer occupancy reached 84 percent, well into the danger zone. In four cities—Philadelphia, Pittsburgh, St. Louis and Seattle—occupancy of freezers was over 90 percent, according to government figures. The brighter side of the picture was the decline in cooler occupancy in 18 key cities from 71 percent to 57 percent during the month of September.

Coffee Cans

PRODUCTION of cans for vacuum packed coffee,—which have not been made for civilian use since 1942 because of wartime metal restrictions —has been resumed, W. C. Stolk, vice-president of American Can Co., has announced.

Mr. Stolk said that although tinplate is not yet available for coffee cans, resumption of production has been made possible by wartime research to perfect technics of coating

Lower your Contamination Losses with G-E Germicidal Lamps

A G-E Germicidal Lamp mounted above vat of orange juice helps prevent the formation of mold.

FOOD losses caused by bacterial or mold contamination during processing or handling are now being materially reduced by the installation of G-E Germicidal Lamps.

Shortwave ultraviolet radiation from G-E Germicidal Lamps kills air-borne bacteria and destroys mold spores. The potent energy emitted by these germicidal lamps has been successfully employed by food packagers, sugar processors and bottlers to cut down contamination losses during processing and storage.

Ask today for the free booklet, "The Lamp that Kills Germs", giving full information on the use of G-E Germicidal Lamps to kill germs, bacteria and mold spores. Write to General Electric, Nela Park, Cleveland 12, Ohio.

G-E GERMICIDAL LAMPS

GENERAL ELECTRIC

Winthrop

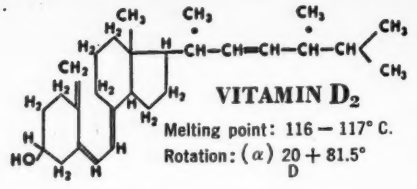
CHEMICAL COMPANY, INC.

Now Offers . . .

PURE CRYSTALLINE

Vitamin D_2

★ (CALCIFEROL)



VITAMIN D_2

Melting point: 116 – 117° C.

Rotation: $(\alpha)_D^{20} + 81.5°$

Winthrop's synthetic vitamin D_2 (Calciferol) is free from lumisterol, toxisterol, suprasterol, and other by-products of irradiation. It never varies in antirachitic potency.

OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
- **VITAMIN B_2** (Riboflavin)
- **NIACINAMIDE**
- **VITAMIN B_6** (Pyridoxine Hydrochloride)
- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **d-ISO-ASCORBIC ACID . . .**
- **AMINO-ACIDS:**
  Tryptophane
  Phenylalanine
  Methionine
- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

POTENCIES AND PACKINGS:

Crystalline form in vials of one five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units — 2,500 Standard Units
1,000 Standard Units — 50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

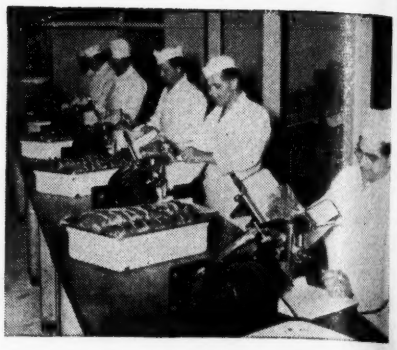
250 Standard Units — 1,000 Standard Units
500 Standard Units — 20,000 Standard Units

*Standard Unit=1,000,000 U. S. P. Units

WINTHROP

For prices and information address
Special Markets Division
WINTHROP CHEMICAL COMPANY, INC.
170 Varick Street, New York 13, N. Y.

★ Sole Manufacturer under U.S. Patent 1,902,785 granted to Winthrop Chemical Company, Inc.



ECONOMY

This meat cutting team at Camp Shanks, N. Y., gives some idea of the efficiency and economy of packaged, frozen meat distribution. Under this system more than 360,000 lb. of meat is claimed to have been saved in ten months, with all soldiers alloted normal Army rations.

and soldering of black iron sheets. Wide usage of black plate for ends of processed food cans and for packaging dry food products during the war, he continued, saved many tons of tin for war uses.

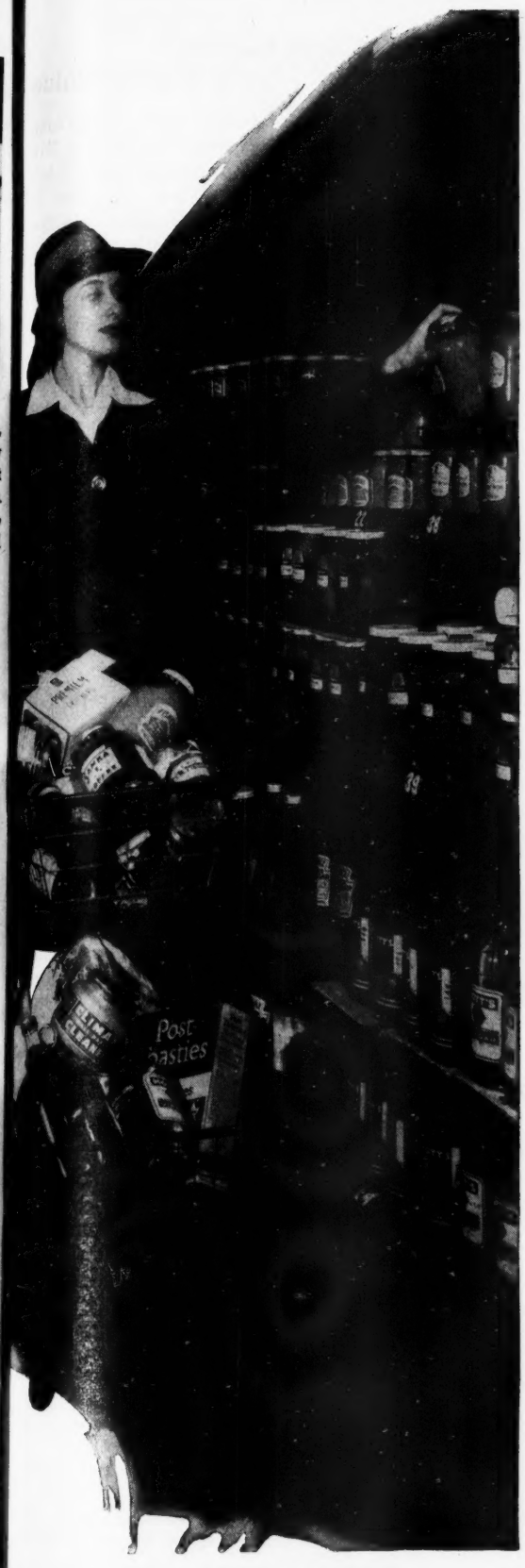
Glass Jar Production Doubled Since 1940

PRODUCTION of glass containers increased from an annual output of 53,391,000 gross in 1940 to an estimated output of 104,000,000 gross in 1945, the War Production Board reports.

During the entire war period there was virtually no construction of new glass plants, WPB pointed out. While a portion of the increased production resulted from maximum utilization of facilities and increased efficiency of the available equipment, the greatest contribution to the increase could be directly attributed to the glass container standardization program adopted by the industry, WPB said. It is estimated that this standardization effected under WPB Order L-103 (glass container and closure simplification) resulted in at least a 20 percent increase in the number of bottles and jars produced.

The increase in units does not tell the complete story because under the standardization program the smallest units were eliminated and emphasis was placed upon production of the large capacity glass containers. This measure substantially contributed to the over-all packaging ability of glass containers. Thus, the units produced in 1945 will not only be equal to about 200 percent of the number produced in 1940, but will be capable of packaging 240 percent more gallonage than was packaged in bottles in 1940.

Merchandising Tips--No. 6



To turn "casuals" into customers—show your wares!

"OH, I *saw* something I liked, and bought it." That's the usual answer of the casual shopper who went to look—and came home with a dozen packages. And it's a big tip too, for merchandisers who want to increase sales and broaden markets.

If *you* want these extra sales, let your product *be seen*—in crystal-clear, inviting Anchorglass! The eye and buy appeal of almost any product is far more powerful when it's revealed—when the shopper can actually *see* what she's buying!

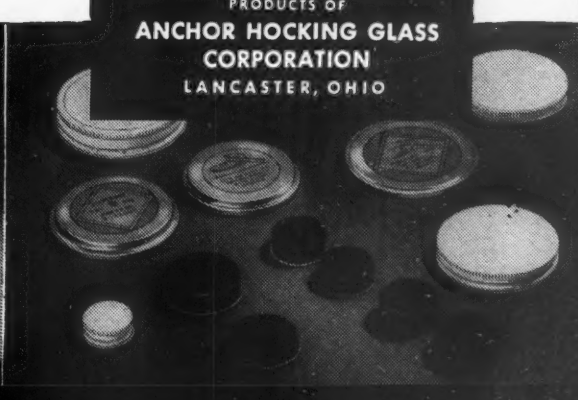
Light, strong Anchorglass containers plus attractive, easy-to-use Anchor Closures will help your product sell faster, protect it perfectly, and keep it fresh and pure to the last bit.

Why not call us in today to show what we mean!

Hear how Anchor Hocking is educating millions of your customers and retailers every week to the advantages of modern glass packaging—Tune in "Hobby Lobby" every Thursday evening, entire Coast-to-Coast Network, CBS.

Anchor
CONTAINERS and CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO



I heard one of 'em say he's from WJW's merchandise sales staff. Boy, radio merchandising must be big business!

BIG BUSINESS is right! In the first year WJW's merchandise sales representatives have made 17,196 SALES PRESENTATIONS on products advertised over WJW.

SALES presentations is right! These 17,196 sales presentations resulted in 5,427 INDIVIDUAL SALES TO RETAIL DEALERS. That's a record for results!

Sales RECORD is right! Actual ORDERS comprising 31% OF ALL PRESENTATIONS proves the point!

And MORE to the point! 4,490 OF THESE SALES WERE TO NEW ACCOUNTS—proving that WJW not only delivers the radio advertising coverage that stimulates dealer interest, but also supplies detailed merchandising cooperation that assures maximum distribution to back up air-vertising's demand!

DO YOU NEED MORE DISTRIBUTION IN WJW'S NORTHERN OHIO COUNTIES?

BASIC
ABC Network
CLEVELAND, O.

WJW

850 KC
5000 Watts
DAY AND NIGHT

REPRESENTED NATIONALLY BY HEADLEY-REED COMPANY

Far East Pig Tin An Unknown Value

THE announcement that 17,000 tons of pig tin had been found in the Far East, which was made by the British Ministry of Supply, is expected to make little, if any, difference in the tin allocations for the months immediately ahead. The tin which was smelted by the Japanese is of unknown quality. Just how much of it will be shipped to the United States is undecided. Negotiations on this point may go on for some time.

The tin captured in Germany did not arrive in this country until six months had elapsed. This may be an indication of what to expect regarding the find in the Far East. There are many details which could delay shipments from the East Indies much longer than six months.

The 17,000 tons represent less than one month's world consumption of tin. If the United States should get it all, it would amount to less than two months' domestic consumption at the current rate. It also is the last known stockpile in the world and authorities are expected to dole it out with the greatest care.

The recent increase in tin quotas for milk cans did not indicate a liberalization of the allocation policy. The action was taken merely to bring the tin allocation into line with the number of cans and steel authorized for the milk can program. The total amount of tin involved in the program is less than two percent of total consumption in this country.

Great pressure is being brought to ease the restrictions on the use of tin cans for non-food items. Any relaxation at this time would come only through a release of Army tin reserve. Washington officials do not believe the Army will permit a reduction of its stocks if the tin is to be used to can dog food and other non-food items.

Tea Controls

RECOMMENDATIONS that all government controls be removed from tea by April 1, 1946, terminal date of the present contract between the Foreign Economic Administration and the British Government, were made at a recent conference of tea importers, import packers, and Government officials, in Washington.

Industry representatives expressed satisfaction at the way tea programs had operated in the past, but voiced the opinion that further controls should not be necessary after April 1.

For Lower Costs with *Stainless Tubing*

. . . get in touch with Carpenter!

● Of course your processing problems are different. And that's just why it will pay you to put Carpenter's know-how to work in your plant. It's a sure way to cut processing costs.

Pressure, heat scale and corrosion problems are taken in stride by this tubing. And wherever strength is a factor, Carpenter Welded Stainless Tubing provides an *extra margin of safety.* Each length is 100% hydrostatically tested.

For engineering help with your corrosion, heat control and fluid handling problems, get in touch with Carpenter. Make use of our long experience with Stainless Tubing.

USE THIS SERVICE TO CUT YOUR COSTS

We have been working closely with process engineers ever since Carpenter invented the first free-machining Stainless, the first bright and ductile Stainless Strip. Put that experience to good use in your plant. Drop us a line for help with your specific problem.

And for printed help, ask for the data file folder on Carpenter Welded Stainless Tubing. It will point the way to lower costs — and trouble-free tubing installations.

CARPENTER WELDED STAINLESS TUBING

SIZES . . . . From 3/8" O. D. to 4½" O. D. Pipe sizes from 1/8" to 2".

GAUGES . . From 11 B. W. G. to 23 B. W. G.

TYPES . . . . 302, 304, 347, 309S, 316, 317, 329, 430, 3-A and Invar.

SHAPES . . . Round, rectangular, oval, flat oval, half-round, drip lip, shrouded.

FINISHES . . White pickled with standard grits. Inside and outside polished tubing for special applications.

THE CARPENTER STEEL COMPANY
Welded Alloy Tube Division
Kenilworth, N. J.

Carpenter
WELDED
STAINLESS TUBING

STAINLESS STEEL STORAGE and PROCESSING TANKS

INCREASE PRODUCTION and EFFICIENCY IN YOUR PLANT WITH THESE SPECIALIZED TANKS

Metal-Glass San-I-Tanks give you safe, clean and rapid handling of any chemicals or liquids. These modern tanks are constructed throughout of 18-8 Stainless Steel making them immune to all acids and exceptionally easy to keep clean.

Tanks are finished with No. 4 polish on inside and bright finish outside. All Stainless Steel welded with inside welds ground smooth and polished.

San-I-Tanks incorporate special self-draining features with specially formed bottoms sloping to the front.

Built by tank specialists, San-I-Tanks incorporate every time saving, money saving feature. For years of trouble free service insist on San-I-Tanks.

MANY SIZES IN STOCK — READY FOR IMMEDIATE SHIPMENT

We endeavor to have a supply of stock sizes in San-I-Tanks on hand at all times. We have a tank for every application and in any size you need. Write us giving complete data on the size tank you need and we will, in many cases, have the tank in stock.

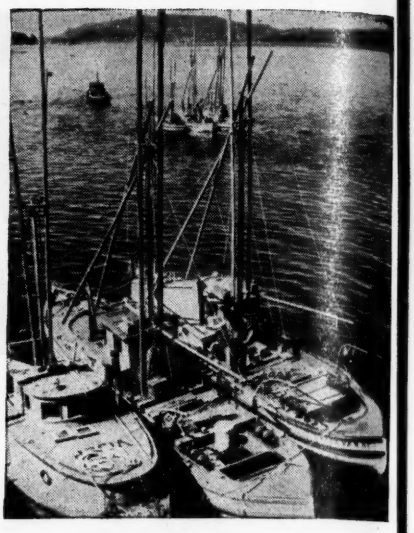
LET OUR ENGINEERS SOLVE YOUR SPECIAL TANK PROBLEMS

In addition to our complete line of stock sizes in San-I-Tanks which are stocked for immediate shipment, we also manufacture special sizes built to your requirements. If you have a special tank problem get in touch with us and our engineers will be glad to give you their suggestions. No obligation of course. If it's a tank problem we can solve it for you. Over 20 years of tank building experience backs the San-I-Tank so play safe and work with a tank specialist.

Write for Complete Literature and Prices

Metal-Glass Products Co.

Dept. FI. Belding, Michigan



BIG SALMON CATCH

Salmon trollers at their moorings was a rare sight when this picture was taken recently at Namu, B. C. The salmon catch was 200 percent larger than last year, and the canneries were kept going at top speed to maintain their pace of cleaning and canning within 24 hours after the catch. It is estimated that 80 percent of the catch will be shipped to Britain to help relieve the meat shortage.

Present Milk Delivery Approved by Housewives

EIGHTY PERCENT of the housewives in the Metropolitan New York area, who have milk delivered to their homes, are satisfied with the present method of every-other-day delivery, a survey by Crossley, Inc., revealed.

The survey also showed that 76 percent of home delivery consumers in the same area would be unwilling to pay 1⅓ cents more per quart for return to every day delivery.

Restrictions prohibiting daily delivery of milk imposed by the Office of Defense Transportation, in June 1943, ended November 1. An impartial scientific study of the costs of distributing milk in the New York-New Jersey area, recently completed by Dr. Leland Spencer, professor of marketing at Cornell University, showed "that the cost of delivering milk to retail customers would be increased by 1⅓ cents a quart if the prewar type of (daily) delivery service were reinstated."

Set-Asides End

FOOD PROCESSORS generally were informed about the termination of the set-aside orders for canned fruits and vegetables some weeks before the action ending set-asides was made, October 8. Important exceptions are the reporting requirements on all items and the set aside of 16

Effective Rodent Control—Even at Cold Temperatures!

At last! A practical and effective solution to the problem of rodent control! Here is a method that eliminates rats and mice even during cold weather, when they are driven indoors by low temperatures—*the very time* when ordinary control measures are least successful.

The secret of rodent control *in all seasons* is fumigation with Dow Methyl Bromide. Even at low temperatures this fumigant works effectively and is easily aerated! It thoroughly penetrates materials and hiding places of rodents and is lethal without arousing their suspicions. In addition, there are other important reasons for insisting upon the use of Dow Methyl Bromide . . . it is economical because labor costs in its application are frequently much lower than other fumigants . . . and it is noninjurious to most food and other commodities when properly applied.

Write today for the leaflet, "How To Control Rats and Mice in All Seasons" . . . it gives you a simple, effective three-point rodent control program. Dow will gladly mail it to you without charge along with the names of industrial fumigators in your locality who specialize in food fumigation.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle

Methyl Bromide

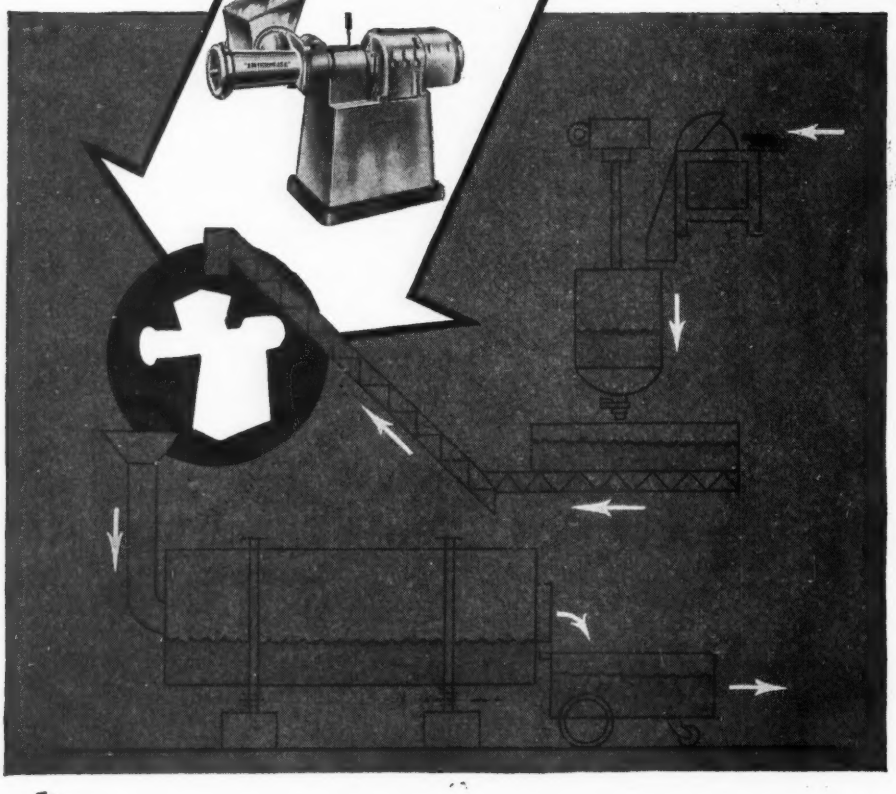
The penetrating fumigant

Write for information on the simple screened box test to determine the effectiveness of your fumigations.

DOW

CHEMICALS
INDISPENSABLE TO INDUSTRY

DEHYDRATING MEAT? Put an "ENTERPRISE" RIGHT THERE!



Dehydrated food can't be of higher quality than the original raw material. But you can protect that quality with an Enterprise Chopper. For—whether it's meat, vegetables, fruits or nuts, an Enterprise cuts it clean; no mashing or squeezing to cause loss of juice and flavor.

Into the Enterprise Chopper is engineered an exclusive System of Cutting—all parts teaming up to produce a better product at a lower cost. It's a "natural" for fast-production lines turning out a quality food. It pays its way with processors of every kind—from bakers to packers, from canners to confectioners.

Let us know your specific problem. 79 years of food-reducing experience will be back of any suggestions we're able to make. No obligation, of course, on your part.

The ENTERPRISE System of Cutting

It's exclusive! *It's superior!*

The ENTERPRISE MFG. CO. of PA.

PHILADELPHIA 33, PA.

79 YEARS' EXPERIENCE BEHIND THE MODERN "ENTERPRISE"

percent for canned tomatoes, both remaining in effect.

Canners are warned that the provisions which require all canners to submit their reports within 15 calendar days after the completion of the pack will be enforced.

More Canned Fish For Civilian Consumption

REDUCTION of government set-asides for canned fish together with imports, recently made available, will bring the available civilian supply of this commodity close to the 1942 total. Civilians will receive close to 400,000,000 lb. from the 1945 pack, about 10,800,000 lb. from Norway and approximately 6,000,000 lb. from South America, which compares with about 423,000,000 lb. in 1942. This total, however, is considerably below the prewar consumption of 600,000,000 lb. annually.

Sardines and tuna make up the bulk of the imports from Norway and South America.

Candy Canceled

CANDY BARS, 327,000,000 of them, contracts for which just have been canceled by the Army and Navy, never will reach the public. They never will reach anywhere, in fact, because they never existed anywhere but on paper.

Food Processors Plan Atlantic City Meeting

THE National Canners Association has selected Convention Hall, Atlantic City, N. J., for the scene of the 1945 Food Processors meeting, February 3 to 8.

The National-American Wholesale Grocers Association, the National Food Brokers Association and the Canning Machinery Association have already signified their intention to join, as usual, with National Canners in simultaneous meetings.

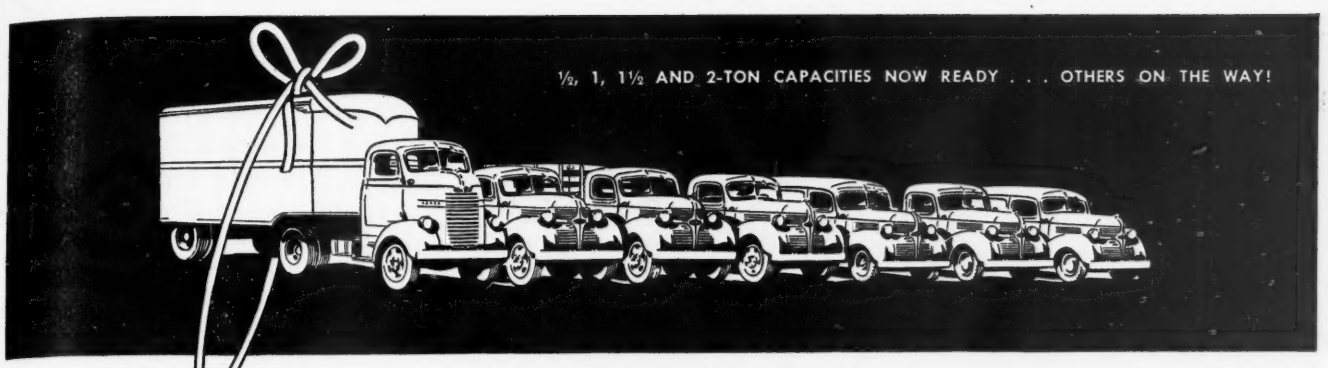
SCHEDULE OF EVENTS

NOVEMBER

7-9 — Grocery Manufacturers of America, annual meeting, Waldorf-Astoria Hotel, New York.
7-9 — American Oil Chemists Society, 19th fall meeting, Hotel La Salle, Chicago.
26-27 — Packaging Institute, annual meeting, Hotel Commodore, New York.
26-27 — American Butter Institute, 37th annual meeting, Drake Hotel, Chicago.
29-Dec. 1 — National Coffee Association, annual convention, Edgewater Beach Hotel, Chicago.

DECEMBER

5-7 — National Association of Manufacturers, golden anniversary congress of American industry, Hotel Waldorf-Astoria, New York.
8-12 — American Society of Refrigerating Engineers, 41st annual meeting, Hotel Pennsylvania, New York.
12-14 — American Bottlers of Carbonated Beverages, annual meeting, Morrison Hotel, Chicago.



BUY VICTORY BONDS

For Early Delivery

SEE YOUR DODGE DEALER NOW

No Priority Required After November 1

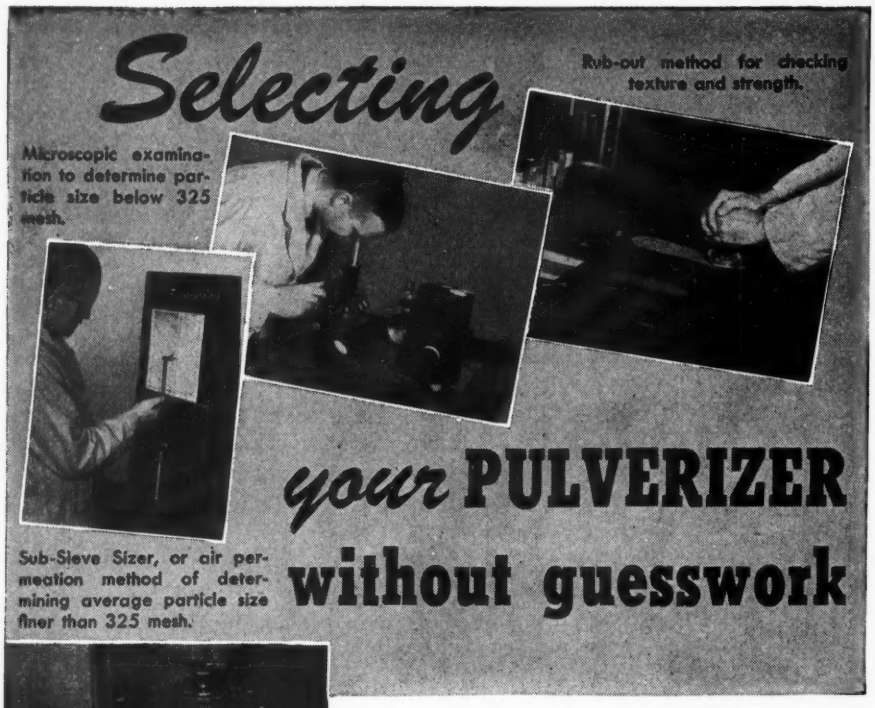
YOU'LL like the way these new and improved trucks cut *your* hauling costs. You'll like the way Dodge engineers have designed them *to fit* your delivery requirements. You'll find that these *Job-Rated* trucks have exactly the *right* engine, the *right* size frame, transmission, clutch, rear axle and every other unit to give *maximum* performance at *lowest* cost! To *save* money, *invest* your money in new Dodge *Job-Rated* trucks!

DODGE DIVISION of CHRYSLER CORPORATION

NEW DODGE *Job-Rated* TRUCKS

LISTEN TO THE MUSIC OF ANDRE KOSTELANETZ WITH GUEST STARS, THURSDAYS, CBS, 9 P.M., E.T.

Because of the dependable and economical service received from Dodge trucks throughout the war, more and more food industries are placing orders for early deliveries of new Dodge Job-Rated trucks.


Selecting
Rub-out method for checking texture and strength.
Microscopic examination to determine particle size below 325 mesh.
your PULVERIZER
without guesswork
Sub-Sieve Sizer, or air permeation method of determining average particle size finer than 325 mesh.

Standard Rotap method of mesh analysis.

Chain-o-matic balance for accurate weighing to within 1-10 of a milligram.

Scott Volumeter for determining apparent densities.

Step-by-step every phase of your pulverizing problem is analyzed scientifically and practically in our Research Laboratory and Test Grinding Department . . . *before* we recommend the type of MIKRO-PULVERIZER or MIKRO-ATOMIZER best suited to your requirements.

The exact operating conditions under which your material is to be ground are reproduced in detail . . . the experience and data gained from over 20 years in the making of over 26,000 tests on all kinds of materials, is applied to its fullest extent.

The resulting report can be your unfailing guide to improved pulverizing operations in your plant . . . a recommendation that provides the only practical basis on which to select the proper pulverizing equipment to best meet your needs.

By Invitation Member
WARRANT of QUALITY

To obtain these services applied to your problem without cost or obligation, simply send for your copy of Confidential Test Grinding Data Sheet.

PULVERIZING MACHINERY COMPANY

97 CHATHAM ROAD • SUMMIT, N. J.

NOW . . . 2 TYPES TO MEET MOST PROCESS JOBS

MIKRO-PULVERIZER (FINE)
MIKRO-ATOMIZER (ULTRA FINE)
Reg. U. S. Pat. Off.

PROCESSING

Dairy Council Expands Projects for Research

DURING the past few years the National Dairy Council research program, sponsored by various groups of the dairy industry, has expanded from a relatively few specific studies to a large number of comprehensive projects. Some of these projects involve as much as ten years of intensive research, and extend into many different related fields of science.

A large portion of the entire research efforts of the dairy industry is planned and supervised by the National Dairy Council. In addition to furnishing direct financial support to certain specific projects, the Council also functions in a liaison capacity for numerous groups in the dairy industry, which are providing funds for research work. Outstanding among this group is the American Dairy Association, now financing a large number of comprehensive studies on nutritional values of dairy foods. Other groups include the International Association of Ice Cream Manufacturers and members of the cocoa and chocolate industries.

Test New Germicides At Experiment Station

NEW germicides tried out in the bacteriological laboratories at the State Experiment Station, Geneva, N. Y., have resulted in the complete destruction of bacterial life within five minutes after exposure of the organisms to concentrations as low as 1 part of the germicide in 20,000 parts of water.

The new materials are known as "quaternary ammonium compounds." While not yet generally available, all data so far collected by the Experiment Station food bacteriologists show a definite future for their use in sterilizing procedures in food processing plants. At present some 15 different materials are being tested at various concentrations against 30 to 40 species of bacteria, including types known to be of importance as causes of spoilage and contamination in food industries.

Bar Preservative

FOOD & Drug Administration has recently made seizures of beverage concentrates in which monochloracetic acid has been used as a preservative in place of benzoate of soda. The Administration has taken

And (you guessed it) we were on the other end!

For Uncle Sam wanted help with some special packaging problems for his servicemen.

The result—Uncle Sam thought we had the right answers; got his problems solved.

That was back in 1941. Since then he's been putting problems up to us regularly. Which is what we like—and would like you to do.

Follow his lead!

Just reach for your phone and call for help—our help.

We'll respond with ideas that may give your product a head start on that tough competition ahead.

And it won't cost you a cent!

For we kept our eyes and ears open on our war job—and are anxious to give you the benefit of our experiences. Add this to our 44 years of research and engineering know-how—and you're really getting something.

Let's get together!

You want an efficient, economical, appealing container for your product—a container that will catch the consumer's eye—and dollar.

So why not make that call to our nearest representative now—or if you'd rather, drop us a line? Let's work out your problem together!

AMERICAN CAN COMPANY

230 PARK AVENUE CANCO NEW YORK 17, N. Y.

World's Largest Manufacturers of Fibre and Metal Containers

METALWOVE CORD WEAVE

SMALLEST OPENING

AUDUBON

Metalwove Cord Weave was especially designed to provide the smallest possible opening obtainable in any flexible wire belt. Openings are considerably smaller than the diameter of the wire used in the weave of the belt. The closeness of the weave provides a very smooth conveying surface, especially adaptable and desirable for continuous baking equipment. Extremely high, flexible, flanged retaining edges are possible on this non-stretching, non-contracting, true running traction driven belt. Our engineers will help you select the correct specification of Cord of other Metalwove Belts, for every application in your plant. Catalog on request.

AUDUBON WIRE CLOTH CORPORATION
Subsidiary of Manganese Steel Forge Co.
2807 Castor Ave. ∴ Philadelphia 34, Pa.

METALWOVE CORD WEAVE

SMOOTHEST SURFACE

ITS THE REAL THING

Experimenting with a new artificial compost formula, developed recently by Prof. J. W. Sinden, Penn State College, William Garzia, Chef Boy-Ar-Dee mushroom expert, recently produced what they think is the world's largest mushroom. It weighs 26 oz. and has a diameter of 10 in.

a definite stand that the use of monochloracetic acid as a preservative will not be permitted. A statement of policy on this may be expected in the very near future.

A trade notice on the subject of monochloracetic acid was made in 1941. The new statement will strengthen the stand originally taken by the Food & Drug Administration and bring the whole subject up to date.

Defense Fund Set Up By National Canners

THE National Canners Association has developed, for its members and distributors of their products, a comprehensive service which provides without charge for the investigation of complaints of illness or injury ascribed to members' products, and for the employment of legal counsel to defend suits for damages which, in the opinion of the association's general counsel, are unfounded or unjust. The association has also set up a trust fund to be used, under certain conditions and in the discretion of the trustees, in contributing to the payment of a judgment against a member or distributor, or to the settlement of a claim, in excess of $1,000.

The fundamental purpose of the association's activities in the investigation of complaints, and in contesting those which are believed to be unfounded and which result in

When the Atomic Bomb hit Taylor's...

THE Atomic Bomb landed on American industry long before it devastated Hiroshima and Nagasaki. Maybe it hit you harder than it hit us. All we know is that here at Taylor Instrument, it had an impact not only on our own organization, but on our suppliers and our customers. Here is what happened:

On a spring day in 1943, the War Department called us in to ask us if we would assume the responsibilities of prime contractor on process control instrumentation for the Kellex Corporation for a secret project called the "Manhattan District." As everybody knows now, this was the Oak Ridge Atomic Bomb Project.

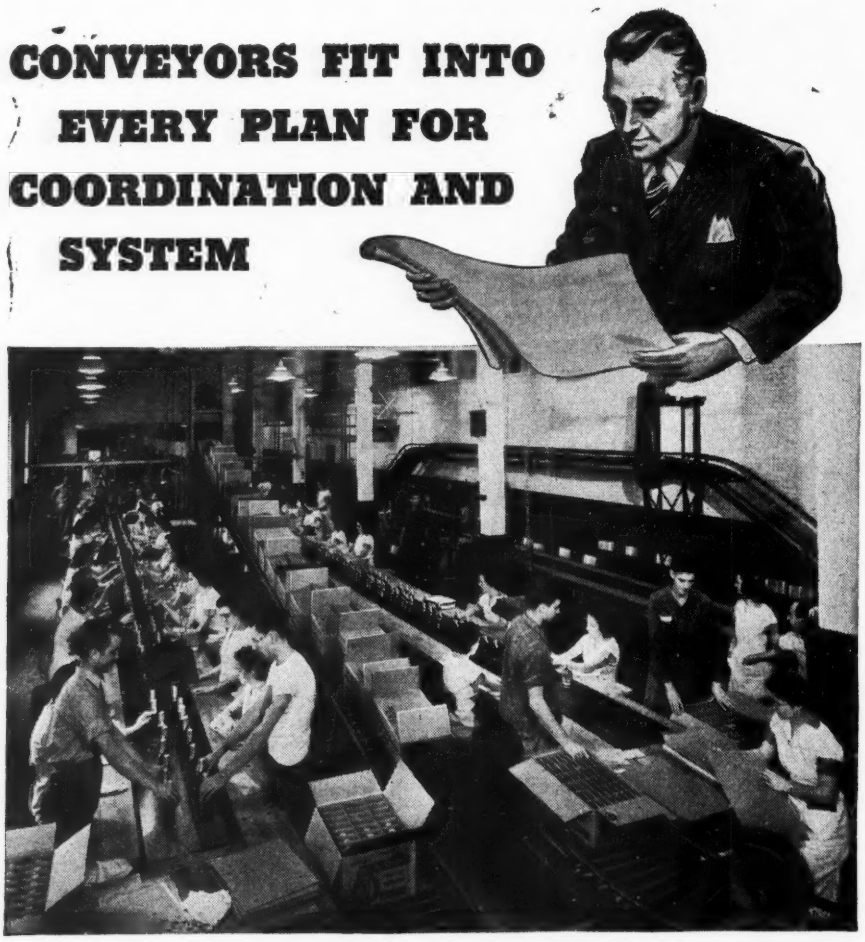
We were already supplying instruments to eleven major branches of the armed forces. Commitments to the super-critical synthetic rubber, 100-octane gasoline and chemical industries programs imposed heavy responsibilites. On top of this, war industries' needs were increasing. Materials were scarce and manpower scarcer. But we were told this was an opportunity to help shorten the war. So of course there could be but one answer.

Our responsibilities included the development, design and production — in unprecedented quantities — of a score of new types of instruments, involving new principles, and closer operating tolerances than had ever before been required of process control instruments. In addition, we were asked to loan a number of our top engineers and technicians to the project.

Our production schedules had to be overhauled. Directives over-rode high-rated war orders. Civilian orders stood at the far end of the line. But the problems were solved, because thousands of people in our plants and in those of our subcontractors devoted their whole time to the project to the extent of seven days a week, month after month.

Naturally, we're proud of the way our organization came through. But we're proud too of our many, many customers who showed patience and understanding in the face of temporary delays in delivery for which we could only offer phoney-sounding excuses. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Taylor Instruments mean "Accuracy First."*

CONVEYORS FIT INTO EVERY PLAN FOR COORDINATION AND SYSTEM



...WITH THE *Plus* OF *FAST* LOW-COST HANDLING

Conveyors are an important weapon in your war on waste and inefficiency. They contribute substantially to the elimination of disorder and confusion—congestion—working hazards.

When you plan for faster, better organized production — check your plan thoroughly on the score of conveying and conveyors.

Why not check with Standard Conveyor—builders of an unusually wide variety of conveying equipment including power and gravity conveyors in belt, roller, chain and slat types, spiral chutes, piling and lifting machines, pneumatic tube systems.

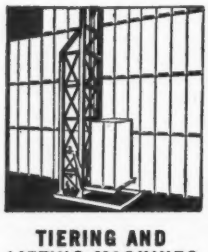
Whether commodities — boxes, cartons, parts, units, packages—have to be moved in a straight line, a curve, up, down, or across, there is Standard equipment to do the job, developed in more than 40 years of service to business and industry.

Write for valuable reference book "Conveyors by Standard," Catalog No. FI-115.

STANDARD CONVEYOR CO.

General Offices: North St. Paul 9, Minn.

Sales and Service in Principal Cities



TIERING AND LIFTING MACHINES

PORTABLE PILERS

SPIRAL CHUTES

PNEUMATIC TUBE SYSTEMS

a lawsuit, is to protect the integrity and reputation of canned foods generally. The appropriation of a considerable portion of the association's budget for this purpose rests upon the premise that, if unfounded or unjustified claims are permitted to go unchecked, the reputation of and public confidence in the products of the industry will suffer.

Twenty Food Plants Win USDA "A" Awards

TWENTY FOOD processing plants have been chosen by the Department of Agriculture to receive the Department's "A" and "Star" Awards in recognition of their outstanding wartime production records. "A" Awards, signifying one full year of leadership in the food processing field, have been awarded to nine plants. "Star" Awards, for a second year of excellent performance, were granted to 11 plants.

The Department announced also that not all the nominations submitted prior to September 15, deadline for consideration, have as yet been reviewed.

"A" Awards have been approved for the following plants:

Wilmington Provision Co., Wilmington, Del.; Oscar Mayer & Co., Chicago.; Henry Fischer Packing Co., Louisville, Ky.; Friend Brothers, Inc., Malden, Mass.; Lake Odessa Canning Co., Lake Odessa, Mich.; Roegelein Provision Co., San Antonio.; Centennial Flouring Mills Co., Tacoma, Wash.; Hy-Dry Food Products, Inc., Centuria and Oscar Mayer & Co., Madison, Wis.

"Star" Awards will go to the following plants:

Birds Eye-Snider, Southern Farms, Pocomoke City, Md.; Chester B. Franz Co., St. Louis.; Plymouth Rock Provision Co., Bronx, American Home Foods, Inc., Rochester, American Processing Co., New York, P. D. Camp & Sons, Cortland, and Dairymen's League Cooperative Ass'n., Massena, N. Y.; Rio Grande Valley Citrus Exchange, Weslaco, and Harlingen Canning Company, Harlingen, Tex.; Stokely Foods, Inc., Milltown, and Stokely Foods, Inc., Plymouth, Wis.

Infrared Furnace

THE success of one of industry's ultra modern scientific devices—the infrared furnace — in the unusual role of barbecuing cattle was revealed at a recent Ceramic Society meeting.

Outdoor infrared cooking of a 900 lb. steer required only 10 hours — less than half the time gas utility officials estimated would be required with the orthodox gas oven.

Coffee Reports

THE Bureau of Customs will continue for the present its reports on the importation of coffee into the United States. This decision will make possible the availability of vitally needed figures during the present critical period.

No, Miss Bates, when I said "What a Line!" I was referring to these well made, dependable, clear-vision Foster-Forbes Standard Bottles"

FOSTER-FORBES

Standard Line Bottles of Quality and Character

FOSTER-FORBES GLASS CO., MARION, INDIANA, U. S. A.

SALES REPRESENTATIVES . . .

KANSAS CITY, DETROIT, CINCINNATI, CHICAGO, CLEVELAND, MILWAUKEE, ST. PAUL, ST. LOUIS, HAVANA, CUBA, ATLANTA, NEW YORK, MEMPHIS, LOUISVILLE

In freezing fruits or vegetables, or ice-cream, or in the cold storage of farm and dairy products, fish or meat—extra profits are realized by increasing production, improving quality, preventing spoilage and reducing operating costs.

The Niagara "No-Frost" Method prevents cooling coils from icing, which insures constant full capacity, thus increasing production.

It quickly brings products to the correct temperatures, thus improving quality.

"No-Frost" Spray Coolers have capacity to hold refrigeration and product temperatures constant, thus preventing spoilage.

The "No-Frost" Method uses less power, thus reducing operating costs.

The Niagara "No-Frost" Method gives month after month trouble-free operation, thus eliminating major maintenance expense.

Write for descriptive bulletin No. 83 today.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

DEPT. FI-115, 6 E. 45th St., NEW YORK 17, N. Y.

Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

The Commerce reports, formally handled by the Office of Price Administration, will require considerable trade cooperation especially in the matter of promptness.

Surplus of "V" Boxes Becomes Army Problem

THE Quartermaster Corps is now struggling with the problem of what to do with the "V" boxes it finds the Army owns as a result of the abrupt ending of much of the Army's food purchasing. It is estimated that there are from 20- to 30,000,000 in the hands of food processors. The Army has two alternatives—to pay food processors the difference in the cost of the "V" boxes and the commercial container and permit the "V" boxes to be used as early as possible, or to buy and store them for later use.

Late last month, it appeared that an effort would be made to use up the "V" boxes as rapidly as possible. There is a great need for all cartons of all types at this time and there will be so many fewer men in uniform in 1946 that they could not possibly use all that are now surplus.

Two Schools Launch Butter Package Study

Two Midwestern universities are launching extensive researches into the packaging and merchandising of butter.

Funds have been established, by the Paraffined Carton Research Council, at the University of Minnesota and the University of Wisconsin, to make tests on all types of butter packaging to determine their comparative degrees of protection for butter from the churn to the table. They will also study the different costs that go into the merchandising of butter in the varied methods of handling it.

The Paraffined Carton Research Council was formed this year and funds were provided to carry on a program of research on specialized food packages, including those for butter, ice cream, margarine, lard, shortening and frozen foods.

No Egg Dumping

THE Department of Agriculture has assured the poultry industry that there will be no "dumping" of frozen eggs which may be declared as surplus property due to recent cancellation by the Army of dried egg contracts. Any frozen egg sup-

Proved in Food Products! C. P. glycerine is a food itself, substantially equivalent in food value to carbohydrate. It has high sweetening power. No wonder it's used by so many manufacturers!

Proved in Cosmetics! C. P. glycerine's non-toxicity, emollient properties, resistance to evaporation, solvent power, and compatibility make it ideal for use in many cosmetics. Use glycerine!

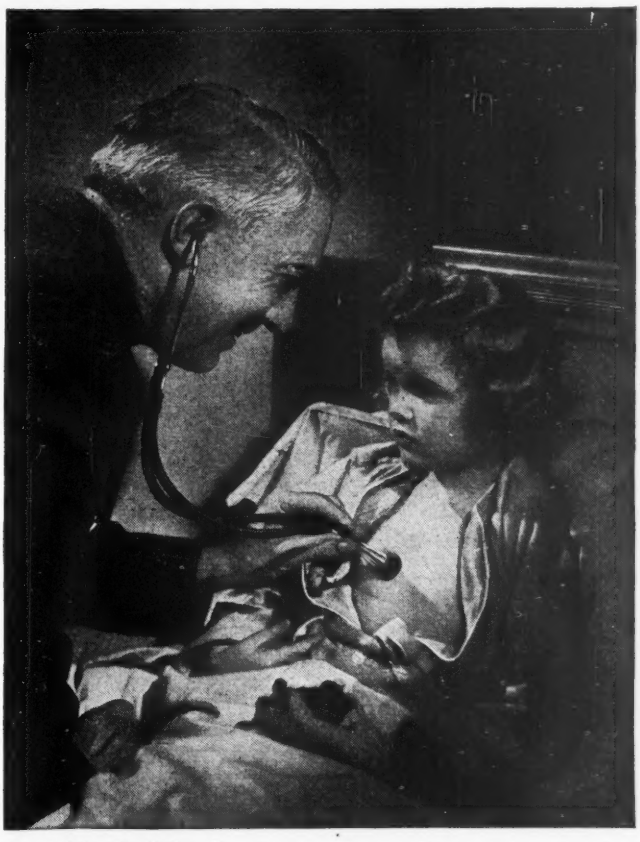
Why Glycerine is a Superior Humectant: PERMANENCE

GLYCERINE as a humectant is permanent. Its permanence is a result of its low vapor pressure, its compatibility with hydrophilic materials, and its lack of tendency to "creep."

In the absence of a permanent humectant, glues dry out and are no longer adhesive and flexible; paper wrappings become dry and brittle; tobacco gives a less smooth and mellow smoke; cosmetics and dentifrices cake and crack; certain leather products become harsh and rough.

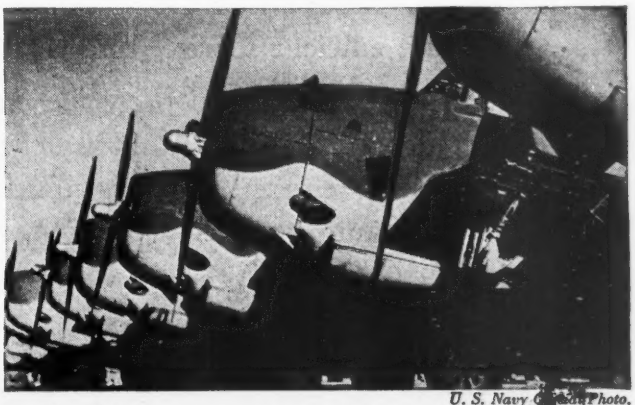
Does the adhesive on your scratch-pad or in a bookbinding become brittle? If so, the chances are that it has not been plasticized with glycerine but with some other material.

Glycerine is not only a superior humectant but a preferred plasticizer, solvent, carrier, preservative, lubricant, and key component in many essential products and materials. Its high viscosity, high solvent power, compatibility, non-toxicity, and other valuable properties can help you make superior products. Use glycerine, the time-tested ingredient, now freely available for the production of civilian goods. Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y., Dept. G-9.



Proved in Medicines! C. P. glycerine, used as a solvent, carrier, and component of ointments, emollient solutions, plasters, and many other pharmaceuticals, is an old standby — proved safe.

Proved in Packaging! Because C. P. glycerine is non-toxic, it is used in the manufacture of transparent wrappings coming in contact with foods or food products. Use glycerine—and be sure!



U. S. Navy Official Photo.

Tough Paints! Long-lasting paints for war equipment and for widespread industrial and home use have been made possible with alkyd resins, of which glycerine is an important raw material.

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Doc Steelstrap is back from the war! *Now your individual needs come first!* To the thousands of manufacturers for whom Doc Steelstrap is a symbol of friendly, efficient service, this is good news.

Doc is again available to prescribe Acme methods of package reinforcement and bracing of carload shipments—to effect lower distribution costs and assure maximum product protection. Write or call any office.

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ACME STEEL COMPANY

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plies which may have to be sold will be disposed of in an orderly manner, the statement said.

RAW MATERIALS

New Tomato Resists Spotted Wilt Virus

A NEW TOMATO, resistant to spotted wilt virus disease, has been developed through cooperation of the University of California and the University of Hawaii, according to Dr. M. W. Gardner, professor of plant pathology on the Berkeley campus of the University of California.

Known as Pearl Harbor, the new variety was the result of a cross of the Bounty variety and the BC-10, and was produced after serveral years of intensive plant breeding by Dr. Gardner, Dr. W. A. Frazier, of Honolulu, Dr. J. E. Knott, professor of truck crops, and other members of the division of truck crops on the Davis campus of the university.

The Pearl Harbor combines the resistance to wilt of one parent with the productivity of the other. More than 150 tomatoes are said to be born on one plant. Indications are that this tomato will become successful for garden and market garden growing but not as a canning variety, Dr. Gardner says. The fruit is smooth and medium small, with unusually small stem-end scar. Immature fruit color is the light green typical of the Bounty; mature fruits are scarlet, he reports.

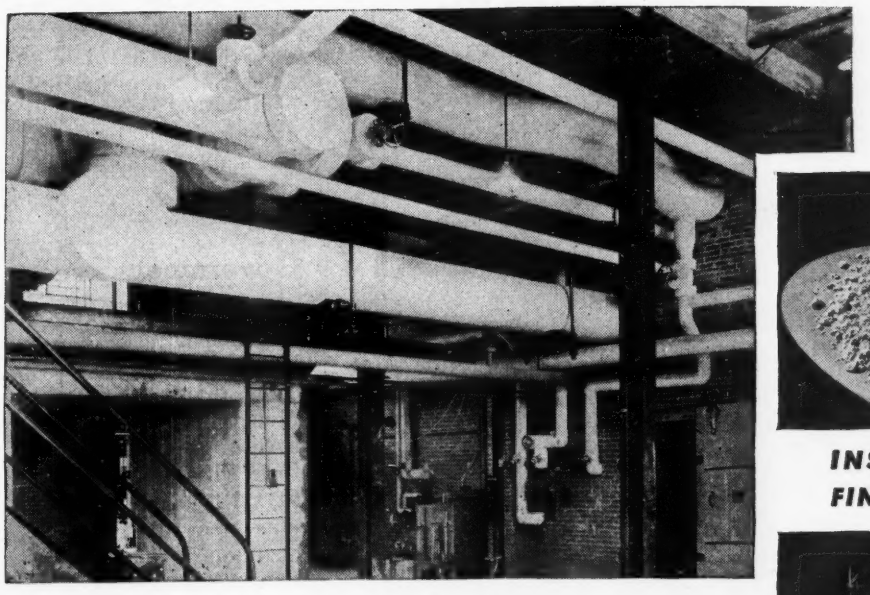
Cling Peaches Make Good Frozen Product

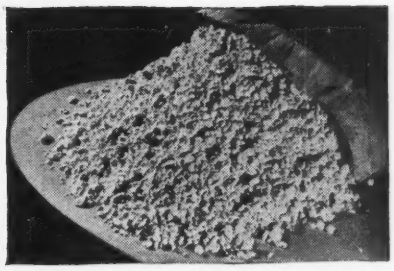
CLING PEACHES keep well when frozen, according to Dr. Leonore Hohl, instructor in food technology on the Berkeley campus, University of California. Dr. Hohl has been experimenting with different varieties of peaches for freezing and declares that the tough texture of the cling prevents them from getting mushy, and permits them to be blanched to preserve their bright color.

Before the war there was great demand for clings for canning but they were considered unfit for freezing, she says. Recently there has been an increase in the demand for canned freestones in preference to clings, Dr. Hohl points out. This, together with the shortage of tin for canning during the war years, has led to the freezing of clings.

Experiments at the university show that most freestones tend to

★"shipshape" appearance





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Fiberglas Insulating and Finishing Cements are excellent companion items used with Fiberglas Insulations in covering pipes, boilers, retorts—all sorts of heated vessels.

Fiberglas Insulating Cement provides a monolithic insulation for pipe bends, fittings, irregular shaped vessels. It combines excellent thermal insulating value with ease of application. This material can be used over steel, brick and insulation blocks and metal mesh blankets. When located outdoors or exposed to moisture or abrasion a protective jacket or a coating of OC Mastic finish should be applied to protect the cement. *Fiberglas Insulating Cement* is made of nodulated Fiberglas Insulation, dry-mixed with refractory-type materials. It is reclaimable up to 1000° F., has low shrinkage and provides an excellent base for Fiberglas Finishing Cement or OC Mastic finish.

Fiberglas Finishing Cement provides a smooth, attractively finished exterior surface when properly applied over the Fiberglas Insulating Cement base. Made of a combination of light-density Fiberglas and suitable binders, it is easy to mix and may be used as a scratch coat, finish coat or both.

There is a form of Fiberglas Insulation Material to meet virtually every industrial need—in the power plant and out through service and process lines. If you do not have complete information on the materials listed in the panel at the right, write today for "Fiberglas Insulations for Industry" . . . *Owens-Corning Fiberglas Corporation, 2009 Nicholas Building, Toledo 1, Ohio.*

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1. PF Pipe Insulation—A lightweight, preformed pipe covering with high insulating efficiency for temperatures up to 600° F. Made in 3-ft. sections or segments for all standard pipe sizes. Fibrous ends of sections intermesh to form tight joints.

2. Blanket Type Pipe Insulation—With mesh wire on outer side to wrap around pipe and secure with wire through special edging. Manufactured in 2-ft. sections for pipes over 3" O.D. Will withstand temperatures up to 1000° F.

3. Metal Mesh Blankets—With mesh wire or expanded metal on one or both sides. Lightweight and easily applied. 2 ft. x 4 ft. and 2 ft. x 8 ft. In standard thicknesses. Two types: For temperatures up to 600° F. and 1000° F.

4. No. 600 PF Block—Same materials as in PF Pipe Covering—in blocks 6" x 36" and 12" x 36", standard thicknesses.

5. OC-1800 High Temperature Block—A highly efficient molded block in sizes 3" x 18" and 6" x 36" and 12" x 36"—in standard thicknesses. Will withstand surface temperatures up to 1800° F.

6. Insulating Cement—For insulating fittings, valves and all irregular surfaces. Highly efficient . . . withstands temperatures up to 1200° Fahrenheit.

7. OC Mastic Finish—An asphalt emulsion cement for insulated pipe and equipment exposed to outdoor or high moisture conditions.

8. Insulating Wool, Type TW-F—Available in bats, rolls and bulk. Used for drying-ovens, heaters, etc., for filling irregular spaces.

9. PF Insulation—Manufactured in 5 densities from 2½ to 9 lbs. per cu. ft.—standard sizes 24" x 48", 1" to 4" in thickness, according to density. For insulated panels, sound absorption and various semi-structural applications.

10. PF Roof Deck Insulation—9 lbs. density with facing to facilitate mopping. Highly efficient, with noncombustible, rotproof and moisture-resistant core, for application under industrial built-up roofings. Sizes 24" x 48". Thicknesses from $\frac{1}{2}$" to 2".

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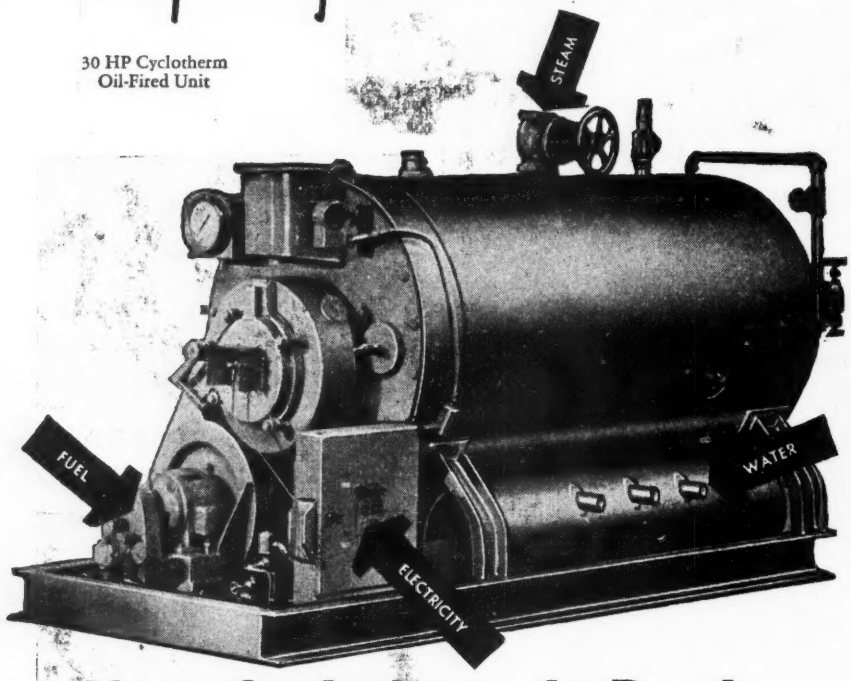

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Cyclotherm is available *without* priority for fast delivery. Once your order is received action is immediate.

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Cyclotherm units range from 5 HP to 200 HP with operating pressures from 15 psi to 200 psi. They are completely self-contained, automatic, oil or gas fired. They are designed on unique principles of combustion that give top efficiency while holding operating and maintenance costs to a minimum.

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become mushy when frozen, and the white kinds darken markedly. The best varieties for freezing are the Elberta, the J. H. Hale, and the Sunbeam. The last makes a nice looking frozen product with no discoloration, but the flavor is flat, Dr. Hohl finds. She suggests that the perfect peach for freezing will have to be developed for that special purpose; in the meantime, clings make a good substitute.

Government Lends Aid In Sugar Production

THE Department of Agriculture has high hopes of converting ethyl alcohol plants at Omaha, Neb., and Muscatine, Iowa, to the manufacture of glucose from surplus potatoes. This would provide an outlet, says the department, for both surplus and low-grade potatoes, and also help to relieve the sugar shortage. About 15 lb. of glucose sirup, equivalent to between 7 and 8 lb. of sugar, can be produced from 100 lb. of potatoes.

Both houses of Congress have passed a resolution to permit alcohol plants to produce sugars and sirups simultaneously with the production of alcohol until July 1, 1946.

The final outrun of refined sugar from the 1945 beet crop is expected to be increased from 17,000 to 20,000 tons over prior estimates by the transportation aid program financed through the Commodity Credit Corp. This additional sugar is to be reclaimed from beet molasses by "Steffens House" processors. The molasses could not profitably be transported to Steffens Houses without CCC aid.

The additional sugar will become available for distribution during the first quarter of 1946, when sugar imports are usually smallest.

New Process Adds to Efficiency of Sugar

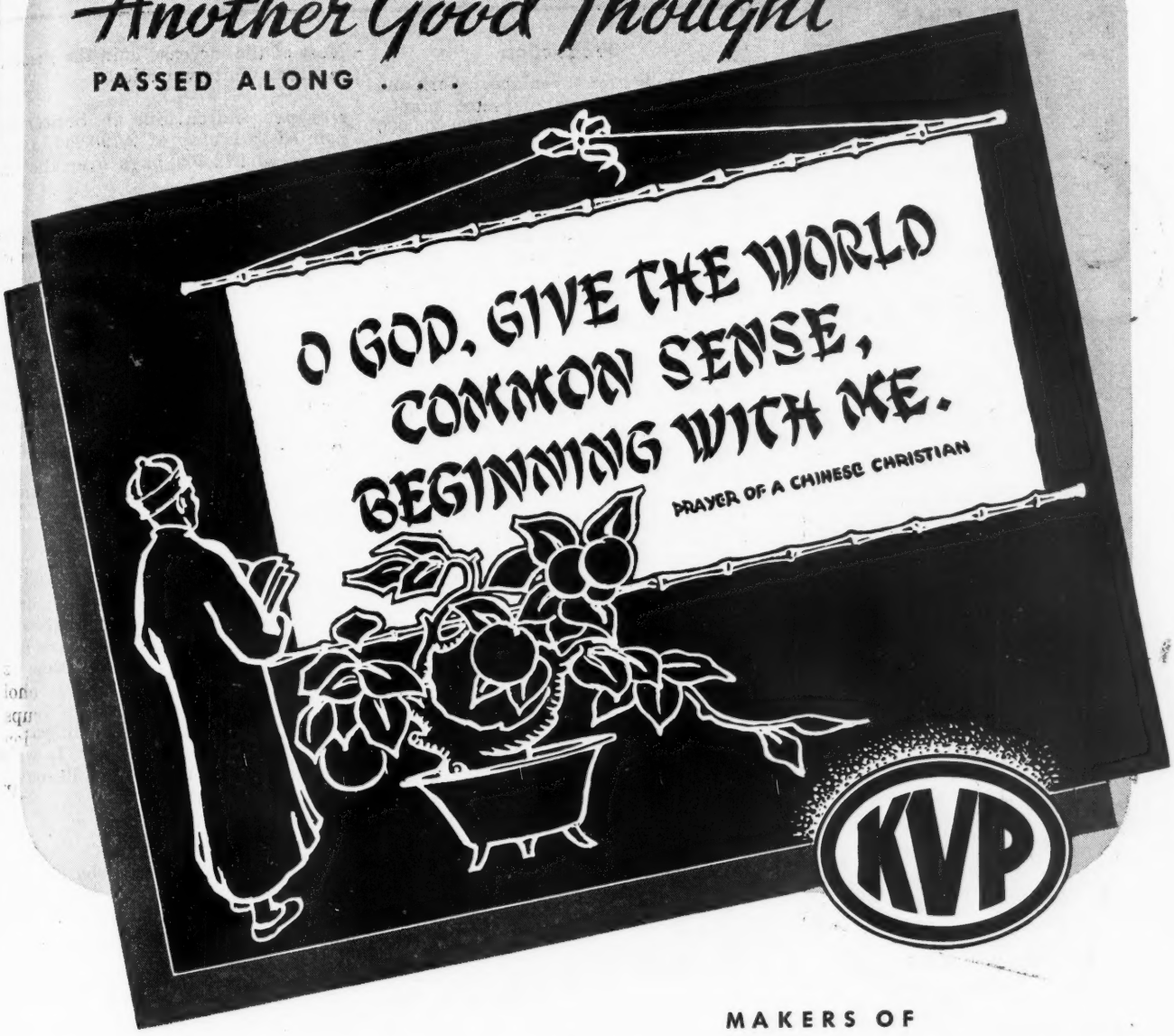
A process for increasing the efficiency of sugar from 15 to 20 percent has been developed by the B-1 Beverage Co., St. Louis.

The new formula, known as X-120 will be offered to B-1 bottlers in an effort to relieve the present sugar shortage. The basic is an enzyme for the conversion of sucrose to dextrose and levulose in the manufacture of syrups for carbonated beverages. No substitutes are used. No heating is necessary.

The process also is said to improve the nutritional value of the sugar used.

Another Good Thought

PASSED ALONG . . .



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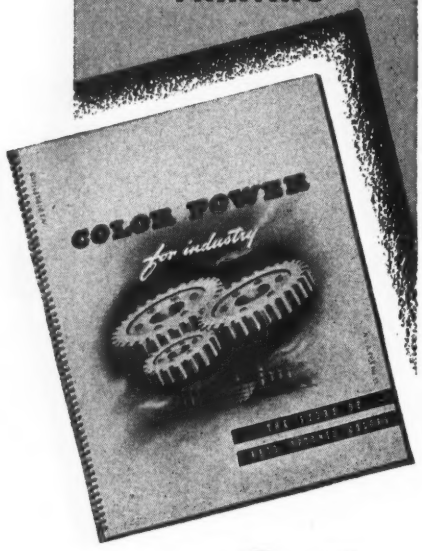

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INDICATORS

Production

Meat production — veal, beef, pork and lamb—in Federally inspected plants, during September, was 1,200,000,000 lb., according to the American Meat Institute. This was 2 percent greater than August, but 6 percent less than September, 1944. Total meat production for 1946 is estimated at approximately 23,000,000,000 lb., or slightly more than this year's estimated 22,700,000,000 lb., but lower than 1944's 24,648,000,000 lb.

Flour production in September totaled 15,238,295 sacks, compared with 16,019,198 in August and 14,806,705 in September, 1944. This represents 73 percent of the total U. S. flour output, according to *The Northwestern Miller.*

Canned asparagus production reached 3,920,504 cases in 1945, which tops the 1944 pack of 3,832,604, according to the National Canners Association.

Red pitted cherry production dropped from 3,071,940 total cases in 1944 to 1,300,490 this year, according to the National Canners Association. Only 561,778 cases were packed in 1943.

U. S. peanut millings came to 6,300,000 lb. in September, 50 percent higher than the same month last year. Of the total 4,300,000 were crushed, the balance cleaned and shelled.

Materials

Fruit production for the year appeared to be about 5 percent less than last season, though approximately 17 percent greater than average. Citrus is running about 5 percent above last year, with oranges down 3 percent and grapefruit showing a 23 percent increase. Peaches, pears and sweet cherry crops show record highs, while apples and sour cherries are record lows. Combined production of the principal deciduous fruits is 13 percent below 1944, 2 percent below the average.

The oats crop is now estimated as the largest on record, totaling 1,575,000,000 bu., larger than the 1920 record, and 35 percent larger than the 1944 crop. The forecast for barley, on September 1, was 278,000,000 bu., 2.4 percent below 1944, but 1.5 above the 1934-43 average.

Dry casein reached the lowest production in 23 years, in August, and was 16 percent less than August, 1944. Stocks, August 31, were 2 percent higher than a year ago, but considerably below 1941 and 1942 comparable dates.

Dry bean reports, in September, indicate a probable crop of 15,370,000 bags (uncleaned), an increase of over 600,000 bags since the August report. Most of the increase is in the Pea and Medium White varieties.

Dry pea indications in September pointed to a crop of 2,793,000, an increase of 272,000 bags over the last report.

Green lima bean production indicates a total of 39,410 tons for 1945, which tops, by a wide margin, the 30,260-ton crop in 1944.

Sugar beet production in North America and Europe is estimated at about 56,900,000 short tons for 1945, or a 3 percent decline from the 65,600,000 tons produced a year ago. This is 27 percent smaller than the 1935-1939 average. While Europe shows a 20 percent decrease, the U. S. and Canada indicate a 37 percent rise.

In Storage

Apple and pear storage estimates indicate only 24,700,000 bu. in storage by December 1. This is approximately 12,600,000 bu. short of last year's holdings and 1,800,000 bu. less than the same date in 1943.

Frozen fish and shellfish holdings were 109,255,546 lb., on October 1, which compares with 112,890,880 lb. on the same date a year ago.

Indexes

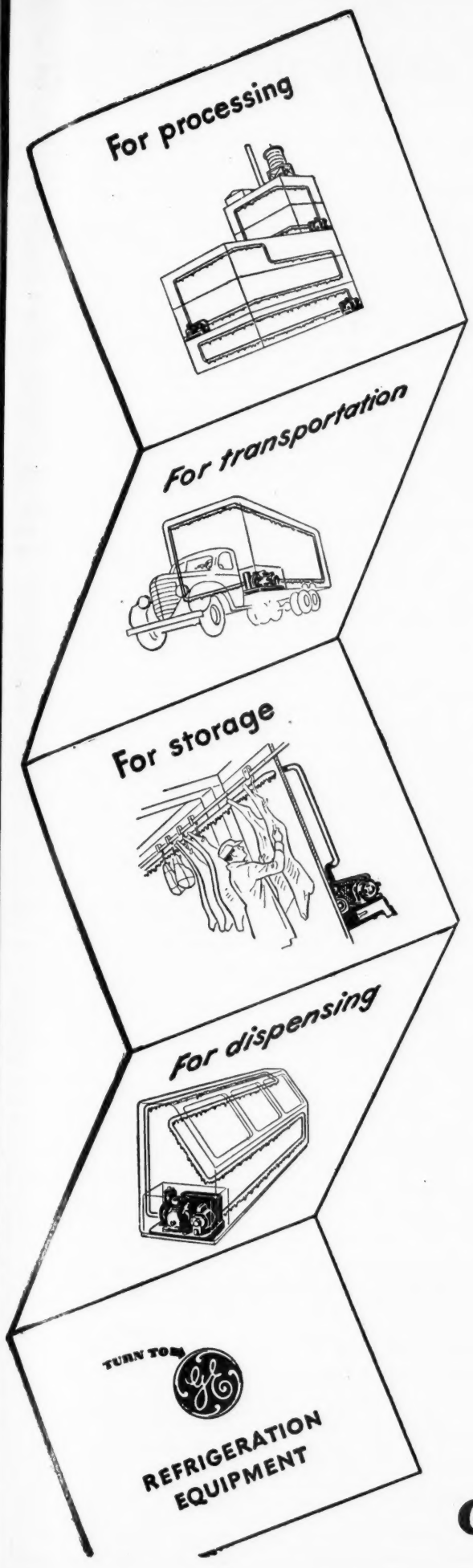
Business Week's index of business activity was 148.0 for the week ending October 27, as against 161.6 a month earlier and 230.6 a year ago.

Wholesale price index of foods compiled by the New York *Journal of Commerce* showed 108.9 for the week ending October 27, compared with 107.5 for September and 107.8 for October, 1944.

Cost of living index of the National Industrial Conference Board was 106.2 for September, 106.6 a month earlier and 105.0 in September, 1944.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded October (thousands)	Total Awarded 1945 (thousands)
Bakery	$ 3,135	$ 146	$ 779
Beverages	6,430	785	4,787
Canning and Preserving	385	1,570	3,017
Cold Storage	460	619	3,797
Confectionery	800	85	235
Grain Mill Products	180	1,219	7,596
Ice, Manufactured	40	...	504
Meats and Meat Products	180	131	918
Milk Products	310	595	5,324
Miscellaneous	3,030	952	11,510
Complete 1945 total	$14,950	$6,102	$38,467



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GRAY	ALL WHITE
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36 x 40...11.90 per doz.	36 x 40... 9.35 per doz.
36 x 44...12.60 per doz.	36 x 44...10.18 per doz.
Full Length Sleeves $9.66 per dozen pair	Full Length Sleeves $7.15 per dozen pair
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BLACK	**HEAVY DOUBLE COATED MAROON NEOPRENE**
27 x 36...$8.40 per doz.	27 x 36..$10.61 per doz.
30 x 36... 9.78 per doz.	30 x 36.. 12.60 per doz.
36 x 40...11.90 per doz.	36 x 40.. 16.50 per doz.
36 x 44...12.60 per doz.	36 x 44.. 18.45 per doz.
Full Length Sleeves $9.66 per dozen pair	Full Length Sleeves $12.90 per dozen pair
Leggings, Hip Length $11.90 per dozen pair	Leggings, Hip Length $23.50 per dozen pair

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

PRICE SUPPORT—The law requires the Department of Agriculture to support certain crop prices under named conditions. The Department is now seeking to have that requirement repealed. That decision has not been announced officially but is perfectly evident from the handling of the potato problem which has been one of the most serious during the fall season. The Department finds that when market prices drop close to the price floor fixed by the law, the growers become indifferent as to the handling of their crops. Thus a whole crop may be suddenly dumped on the lap of the government, as was some $50 million worth of potatoes this year.

JAVA SUGAR FIND—Washington has happily publicized the discovery that there was a large stock of raw sugar in Java, estimated to amount to a million and a half tons. In a play to the voters, officials announce this discovery as if it were going to result in immediate lifting of sugar rationing. These officials know better. There is no chance of any significant change in the predictable future in sugar supply for food manufacture, for example. Privately, government men guess that rationing will be necessary for at least a year from this fall. Food manufacturers will be among the last to be relieved of restrictions during 1946, an election year.

ABSORB WAGE BOOSTS—Many government men will not let go willingly of the theory that wage increases must be absorbed by manufacturers and distributors in order to prevent a rise in the cost of living. One of the favorite arguments still heard in Washington is based on the high-profit experience of certain merchandising firms, notably department stores. By cutting off many services such as special wrappings, deliveries and common courtesies, these firms have made more money in recent years than ever before, despite the shortage of goods and the increased wages which they have paid. Food manufacturers are going to be up against the argument that they too can absorb wage increases, even in some cases where the officials making the claims know better.

GOVERNMENT RESEARCH—Congressional consideration of government support for research is all mixed up with the discussion as to what to do with atomic bombs and atomic energy. Many officials and legislators seem to think that government participation in future research, a prospect support this winter, requires sional support this winter, requires that the government control all resulting patents and inject itself into the business management through which new science will be applied in industry. The result is a new danger that privately financed research may not remain as free from government interference as it should.

DEFICIT POLICIES—During 1946, the voters will notice their tax bills are less than heretofore. Congressmen hope that they will be given the credit for this change and hence be more cordially supported at the polls next November. This explains the fact that heavy tax cuts are planned by Congress and that little or no attention is being given to the question of curtailment of the public debt. Deficit financing seems certain to continue for some time longer, with consequent inflationary tendencies of serious magnitude.

SPEED VS. ICE—The food industries are promised many new developments in rapid transport as rail and air agencies undertake to gain a larger percentage of the food hauling business. Air transport advocates argue that proper packaging of cooled foods prevents spoilage because of the speed of delivery. The railway and highway advocates are working on new methods of icing or refrigerating of new lightweight, high-quality containers, cars and trucks. The owner of perishable food is going to be compelled to make a technical decision as to whether he wants his goods refrigerated en route or whether he wants to pay to have them moved at such high speed by air that refrigeration

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is not necessary. The food technologist will first need to determine the dependability of the two delivery processes. Then he can judge as a second factor the relative cost per unit of goods at the ultimate market. Generalizations certainly are not safe.

FAT RATIONS—When the Department of Agriculture removes rationing from fats and oils, these restrictions will be taken off for good. Secretary Anderson does not hesitate to emphasize that he intends to keep rationing long enough to be sure that he will not need to return to restrictions after they have once been dropped. Even though the Army has released between 80 and 100 million lbs. of butter, which will help a lot in civilian supply, restrictions on that and other fats and oils will be continued well into next year, if necessary. However, the Secretary has said positively that he "hopes" to drop fat and oil rationing at the beginning of the new year.

WEIGHT SAVING—Some of the new methods of transport proposed for food make highly advantageous the saving of weight and bulk of the goods to be moved. This means that poultry and fish must be dressed or filleted before shipping. It means that compacted packaging has great dollar advantage. The result may be a new and determining factor in the placing of food factories. We shall have to take our food processing back close to the raw material sources in many cases in order to get the most economic transport.

ON OUR OWN—Industry is gradually being released from wartime restrictions. Civilian Production Administration is replacing War Production Board. CPA will have most of the war powers of WPB but hopes not to exercise them except on very scarce materials, to prevent hoarding and speculation, or to provide special aid in the widening of bottlenecks which delay reconversion. Smart executives will use the help of CPA when necessary, but they will avoid running to Washington for aid when they can do it "on their own."

GOOD CROPS—Nature has again been kind to the United States. Almost all the important crops this year are expected to be equal to all but the two peak years of 1942 and 1944. Thus food processors will have an abuntant raw material supply for almost everything.

EGG GRADES—Much confusion exists in the pricing and selling of eggs under various state laws. Although the nose at the breakfast table can tell readily when an egg is not "fresh", the definitions of various states are quite different. The Federal government is making a little effort to see if some measure of coordination cannot be developed. The rules of States vary so widely that this is going to be a very difficult matter.

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ETHAVAN (Ethyl Vanillin)—Highly aromatic synthetic flavoring agent similar to vanillin but not identical with it. Flavoring strength approximately three times vanillin.

METHYL SALICYLATE (U.S.P.)—Synthetic oil of wintergreen for flavoring foodstuffs and beverages.

VANILLIN MONSANTO (U.S.P.)—Synthetic vanilla flavoring agent.

MONSANTO'S SYNTHETIC FLAVORING MATERIALS ARE ALWAYS OF THE SAME HIGH QUALITY

Monsanto flavors have won the enthusiastic approval of thousands of users. That's because they always have the same high flavoring strength—the result of Monsanto's exacting manufacturing methods and strict laboratory control. You can count on uniform results *always* if you use Monsanto flavoring materials in your product.

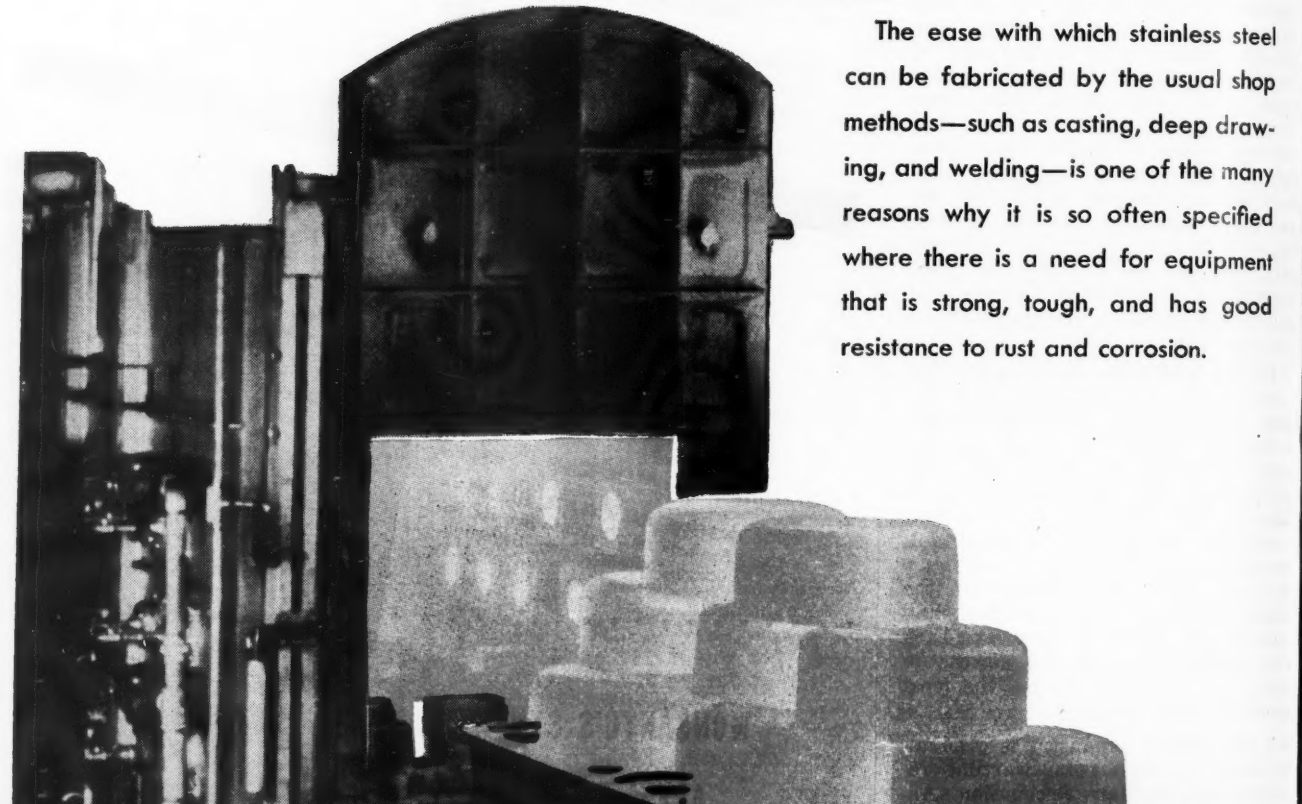
Samples of Monsanto flavorings, together with booklets containing technical data and information on their uses will be sent on request. Write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal. Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

Bake in a Hot Oven . . . 1,950°F.

These red hot "cakes" are partially drawn stainless steel kettles that have just been annealed prior to further deep drawing. Strong, corrosion-resistant, and easy to clean, the kettles are of the type used extensively in hospitals, restaurants, and other institutional kitchens.

The ease with which stainless steel can be fabricated by the usual shop methods—such as casting, deep drawing, and welding—is one of the many reasons why it is so often specified where there is a need for equipment that is strong, tough, and has good resistance to rust and corrosion.



Other uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, a Unit of UNION CARBIDE AND CARBON CORPORATION. ELECTROMET does not make steel, but produces the ferro-alloys used in its manufacture. If you need this complimentary publication, write to ELECTRO METALLURGICAL COMPANY, 30 East 42nd Street, New York 17, N. Y.

Buy and Hold United States Victory Bonds and Stamps

MEN • JOBS • COMPANIES

INDUSTRY

Beech-Nut Packing Co. plans to erect an $800,000 plant for strained and baby foods on a recently purchased site at San Jose, Calif. The new unit is scheduled to begin operations next year.

Bercut-Richards Packing Co., Sacramento, Calif., was damaged by fire in late August to the extent of $400,000. Other fires reported during the month were: Berlin Milling Co., Berlin, Md., where flames consumed the flour and feed mill, and the Kerr-Gifford flour mill at Pendleton, Ore., with damage estimated at $250,000.

Cinderella Foods, Dawson, Ga., will sponsor a research project at Southern Research Institute directed toward improving the quality of peanut butter and extending the food uses for peanuts.

Doughnut Corporation of America has appointed F. M. MacGregor to its executive staff as director of purchases. In his new capacity, Mr. MacGregor will be in charge of buying for Mayflower Doughnut Corp., Mayflower Retail Shops, Domestic Egg Products, Inc., Doco Products Co., Canadian Doughnut Co., Ltd., British Doughnut Co., Ltd. and Doughnut Corporation of America.

Georgia Peanut Co. has awarded a contract for the construction of a storage and shelling plant to be operated by East Georgia Peanut Co. at Statesboro, Ga.

Grocers Packing Co., Modesto, Calif., is building a new $175,000 plant for the manufacture of macaroni and packaging of bulk foods.

Holly Sugar Co., Colorado Springs, Colo., is planning construction of its fifth California sugar beet refinery. A $3,000,000 plant to provide processing facilities for 13,000 acres of Imperial Valley beets will be completed in early 1947. Holly now operates two plants in Colorado, two in Montana and three in Wyoming in addition to the California units.

Hunt Foods, Inc., and California Conserving Co. recently reached an agreement for consolidation of the two companies. Under the merger, M. E. Wagenheim, president of California Conserving Co., will become president and Frederick B. Weisman, acting president of Hunt's, will become executive vice-president. The merged company will be known as Hunt Foods, Inc., although California Conserving's brand names will be continued. Combined sales volume of the two firms probably will exced $30,000,000.

GEORGE H. COPPERS

General Counsel of National Biscuit Co. since 1938, George H. Coppers has been elected president of the company. Roy E. Tomlinson, who has served as president for 28 years, is now chairman of the board.

JOHN HAGY

Announcement has been made of the appointment of John Hagy as executive vice-president of The Freihofer Baking Co., Philadelphia. He has been engaged in an executive capacity in the baking industry for many years.

Kroger Grocery and Baking Co. has sold its meat packing plant at Omaha, Neb. to Kingan Co., Indianapolis.

Maletis and Sons has established a new winery in Portland, Ore., to produce 500,000 gal. of wine annually.

A. E. Staley Manufacturing Co. has completed a $2,000,000 soybean oil extraction plant in Decatur, Ill. The new mill, largest of its kind in the nation, increases the company's soybean oil and meal production capacity by 50 percent. Hexane, a highly volatile petroleum product, is used by the plant as a solvent for extraction of oil, leaving less than one percent of oil in the soybean meal.

DR. E. M. KEMLER

Recently appointed head of the newly created Engineering Research Division of the Southern Research Institute. Dr. E. M. Kemler comes to the Institute from Purdue University where he was professor of Mechanical Engineering.

Welch Grape Juice Co. plans to start immediate construction on several new buildings at Springdale, Ark. The expansion program resulted from consolidation of the Welch Grape Juice Co.'s organization with the National Grape Juice Co-operative recently.

PERSONNEL

Louis S. Anderson, executive vice-president and general manager of Reid, Murdoch and Co., Chicago, has resigned after 35 years with the company.

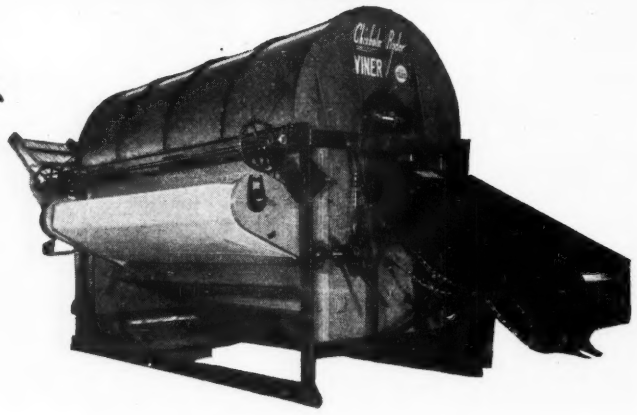
E. G. Applegate, formerly head of the engineering department of Oscar Mayer and Co., Chicago, is now a member of General Baking Company's engineering staff with headquarters in New York.

Welch Grape Juice Co. plans to start B. Long and Co., Chicago, as chief chemist. He was formerly technical editor for the Manufacturing Confectioner, Chicago.

Elden L. Dosch is the newly appointed director of research of Henkel Flour Mill, Detroit, and other divisions of the

OVER HALF A CENTURY OF KNOWING HOW 1890 – 1945

CRCO CONFIDENCE ... born of experience



Capacity To Meet *All* Conditions

Fifty-five years experience in designing and building Pea Viners is back of the CRCO Steel Frame Adjustable Beater Viner—the most complete, longest lived and most economical to operate Viner in use today.

CRCO Steel Frame Viners have exceptionally large capacities, the Model 1635 delivering nearly twice as much quality product as the ordinary models.

In addition to all of the outstanding features of the time-tested and proven CRCO Wood Frame Viners, the Steel Frame Series has such additional advantages as a more rigid framework, Freedom from structural failures, lower center of gravity, easier portability, accessibility of moving parts, Timken bearings and interchangeable repair parts.

Send for complete details on the Viner that has a capacity to meet all unusual conditions.

Guards to comply with the various State safety requirements are available as an extra on any Steel Frame Viner.

THE BEST OF Everything

CHISHOLM-RYDER
Niagara Falls, New York
FOR · THE · FOOD · PROCESSOR ·

International Milling Co. In his new position, Mr. Dosch will be responsible for the supervision of all product control laboratories of the company and for research into product improvement and new product development.

Clarence E. Gwinn, formerly secretary-treasurer of Gwinn Milling Co., Columbus, Ohio, has been elected president, succeeding J. E. McLean, who has retired.

Eric J. Hewitt, formerly director of research for Rare Chemicals, Inc., Flemington, N. J., is now with Ralph L. Evans Associates, New York.

Robert H. Montgomery, vice-president and manager of the Goodlander Mills Co., Fort Scott, Kan., a unit of Flour Mills of America, Inc., has been elected a vice-president of the latter organization.

Austin Morton has become general sales manager of Kansas Flour Mills Co., Kansas City, Mo., succeeding William R. Duerr, now executive sales director of Flour Mills of America, Inc., the parent firm.

L. E. Neel recently was elected president of the Canners League of California. He will serve for the unexpired term of Fred M. Drew who has resigned as president of the League. Mr. Neel is general manager of the Turlock Cooperative Growers, Modesto, Calif.

Marvin E. Neumann, dairyman and rancher of Le Grand, Calif., was elected president and chairman of the board of the Challenge Cream and Butter Association at a recent directors' meeting. He succeeds Boyd Stewart who resigned. The association has 55 plants and 37,000 cooperative members in ten western states and operates its own marketing agencies in Pacific Coast metropolitan areas.

Frederick W. Pritchard has been elected vice-president and treasurer of the Goebel Brewing Co., Detroit. He formerly was vice-president and treasurer of the McAller Manufacturing Co.

H. F. Stose has joined the research and development division of the American Chicle Co., Long Island City, N. Y. He was formerly with Owens-Illinois Glass Co., Toledo.

R. Douglas Stuart, president of The Quaker Oats Co., Chicago, was elected one of the directors of the International Minerals and Chemical Corp., Chicago.

Dr. R. J. Sumner has accepted the position of director of research of the C. J. Patterson Co.

R. D. Trelease of the poultry products section of the Quartermaster Corps Subsistence Research and De-

A FOOD STARCH

FOR SALAD DRESSINGS *with a creamier texture*

PURITY "PWS" is a one-piece food starch that cooks to a glossy, heavy-bodied, creamier texture. Its stability, semi-translucence and bland flavor produce more appealing salad dressings with longer shelf life.

PURITY "PWS" is readily available. And being a one-piece food starch, it comes to you ready to be used pound for pound as a replacement for the starches you are blending. It eliminates all variations in salad dressing quality — caused by errors in weighing when two or more starches are used.

— and in addition, PURITY "PWS" offers the further production and sales advantages of scientifically controlled uniform stability — a stability that permits easy formulation with other ingredients to produce a smooth emulsion over an unusually wide temperature range . . . that resists breakdown even when milled . . . that provides long shelf life with negligible shrinkage under normal aging conditions. Test it in your formulas — NOW!

Note: National has compiled a useful handbook of facts on "SALAD DRESSING PRODUCTION". It outlines principles and procedures found by experience to constitute proper commercial practice. It should interest everyone producing or contemplating the manufacture of salad dressings. Write for your copy.

National also produces: PURITY "C", a quality starch thickener for fruit fillings; MELOJEL, a double-refined corn starch; FLOJEL, a confectioners' starch in all accurately controlled fluidities; MOLDING STARCH, properly lubricated for gum drops, etc.; PURITY GLAZE, an oil-sealer for coating almonds, and AMIOCA, the new domestic starch.

Offices: 270 Madison Avenue, New York 16; Boston, Philadelphia, Chicago, Indianapolis, San Francisco and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal.

DUNELLEN PLANT

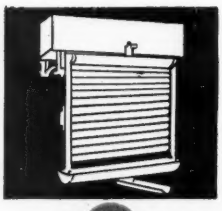
National
STARCH PRODUCTS

STARCHES—AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY

Keeping MILK EQUIPMENT Clean and Sanitary

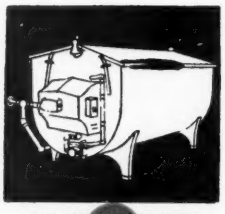
MILK CANS

Your choice of detergent and method of application for sanitizing your milk and food processing and handling equipment can importantly influence the quality of your product. Using a material not specifically designed for the job or applying a suitable material incorrectly will boost bacteria counts and jeapordize product quality.

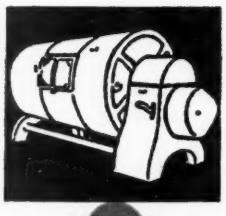


COOLERS

Specially-designed Oakite cleaning compounds can help you to safeguard your product quality through their proved ability to remove completely every trace of bacteria-harboring milk or food residue. Oakite Techniques, tailored to fit your individual requirements, can help you to expedite your daily clean-up practices . . . put them on an efficient, low-cost basis.



PASTEURIZERS



CHURNS

Make Use of Oakite's FREE Nation-Wide Service!

Oakite welcomes the opportunity, through their nation-wide Technical Field Service Staff to assist you in setting up a smooth, trouble-free plant and equipment cleaning program. Write today for FREE demonstration . . . helpful literature. Your inquiries are invited, promptly answered!

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OAKITE MATERIALS METHODS SERVICE — Keep Buying Bonds — CLEANING FOR EVERY CLEANING REQUIREMENT

velopment Laboratory has returned to his former poultry research work in the Swift and Co. research laboratories.

Gilbert C. Van Camp has been elected president of the California Fish Canners Association. He is with the Van Camp Sea Food Co. with plants at Terminal Island, Calif., and Astoria, Ore.

L. L. Wiseman, chief chemist for the Quartermaster Corps Chemical Control Laboratory, Chicago, has joined the American Institute of Baking chemical staff.

DEATHS

James S. Agar, 81, former president of Agar Packing and Provision Corp., Chicago, and American Meat Institute, September 29, in Montclair, N. J.

Louis L. Bronson, 57, general manager of the Canned Food Division, Armour and Co., Chicago, September 8.

Sol L. Buschman, 55, president and a director of National Can Corp., September 24, in New York City.

William H. Cowan, cofounder of De-Haven Ice Cream Co., Cincinnati, October 7, in Cincinnati.

Francis J. French, former president R. T. French Co., Rochester, N. Y., October 12.

Thomas H. Gallon, president, Sugar Sales Corp., Brooklyn, September 28.

Erhard Guenther, 76, president of Pioneer Flour Mills, Temple, Tex., September 25.

Milton S. Hershey, 88, founder of Hershey Chocolate Co., October 13, Hershey, Pa.

Louis C. Hunt, 65, owner, Hunt Packing Co., Columbus, Ohio, October 4.

William A. Kerber, 80, founder, Kerber Packing Co., Elgin, Ill., October 1.

Henry Meyers, 55, traffic manager of Kroger Grocery and Baking Co., Detroit, September 22.

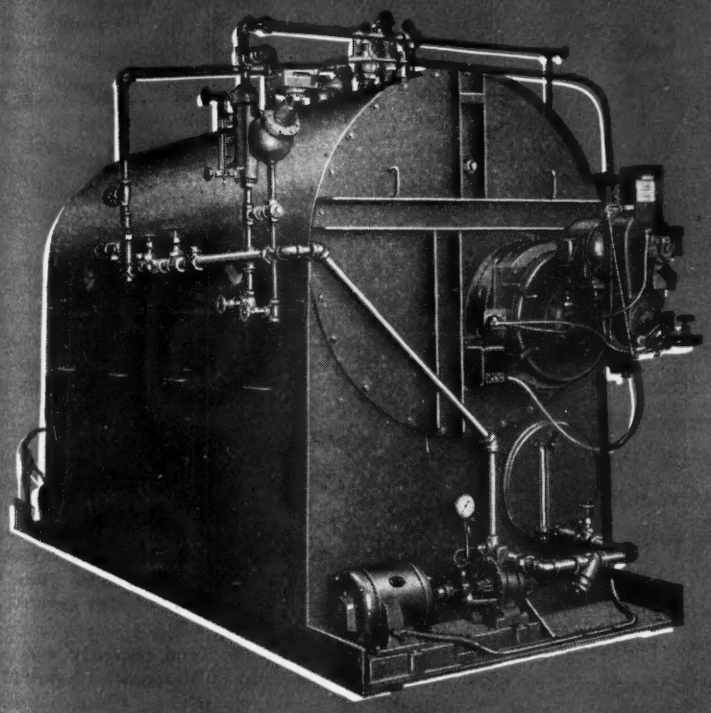
John H. Pettey, 58, manager of Planters Oil Mill, Greenwood, Miss., September 20.

Edward J. Shults, 49, vice-president of Comstock Canning Corp., Newark, N. Y., September 28.

Thomas J. Sweet, 62, buying executive for Continental Foods Co., Albion, N. Y., recently.

Hugo H. Voedisch, 50, vice-president of South Bend Brewing Co., South Bend, Ind., September 20.

PROUD TO BE A VETERAN



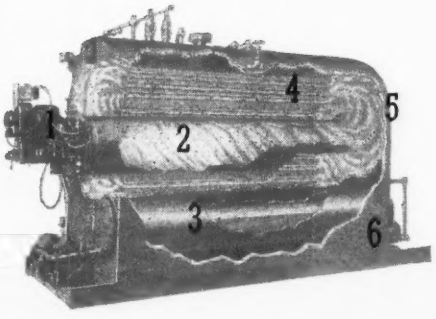
Serving the U. S. Navy under every imaginable condition has taught us many things about automatic boiler design that, supplemented by our 65 years experience, make the Dutton Econotherm the outstanding automatic, "packaged" boiler on the market. You are assured maximum in efficiency and economy because the Econotherm has met Navy tests that make ordinary boiler room requirements seem like child's play! Because of this experience, we can offer you a boiler that is ready to set down and run without costly or lengthy installation work. All gases scavenged — no chimney necessary other than small pipe to carry flue gases through roof. Entirely self-contained and completely insulated — faster firing and steaming — compact enough to produce twice the steam in half the usual space—meets maximum steam withdrawals with complete safety — and requires a minimum of supervision.

SOME OF THE FEATURES THAT BROUGHT OVERWHELMING NAVY APPROVAL!

1 Oil or gas fired —automatic ignition.

2 Quick firing exclusive Dutton Rotary Combustion.

3 Condensate return tank in casing.



4 Three Pass Induced Draft system.

5 Completely insulated.

6 Compact, streamlined casing.

Dutton

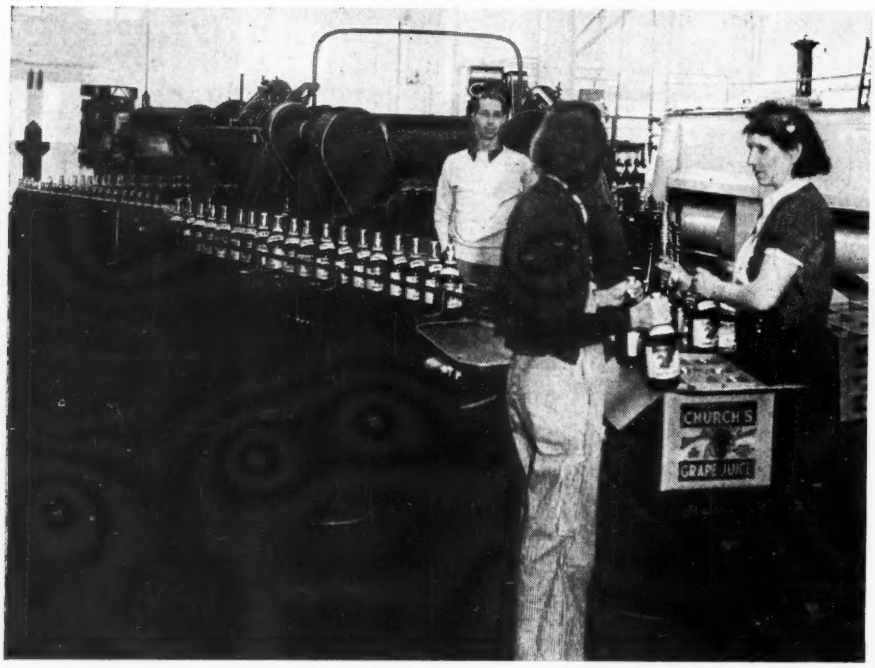
ECONOTHERM

AUTOMATIC STEAM GENERATOR

DUTTON ECONOMIST HIGH PRESSURE BOILERS
DUTTON AUTOMATIC VERTICAL BOILERS
PRESSURE VESSELS • CONDENSERS
HEAT EXCHANGERS

THE C. H. DUTTON COMPANY • 610 Gibson Street, Kalamazoo, Michigan

IN KENNEWICK OR KALAMAZOO . . .
"You Get The Best Labelers In The WORLD"



"World Rotary Labelers have always done a first class job for us", says Mr. F. M. Ludlow, General Manager of Church Grape Juice Company, Kennewick, Washington, "and our first one was installed many years ago."

"Before the emergency caused us to drop back to a single label application, we used these Labelers for applying foil and neck labels as well as body labels and we have never been disappointed with their performance."

Bottlers the world over testify to the dependability of WORLD ROTARY Labelers under severe emergency production conditions as well as long before. Dependable performance and low overall operating and maintenance costs are going to be no less desirable in the years to come.

Ask us to give you the facts and figures on what a modern WORLD ROTARY installation can do for you.

WORLD LABELERS

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Denver
Louisville Salt Lake City El Paso Seattle Portland Peoria Lubbock
Montreal Toronto Winnipeg Spokane Vancouver Mexico City
Sydney, Australia Wellington, N.Z. San Juan, P.R. Ciudad Trujillo, D.R.

ASSOCIATED INDUSTRIES

The Aluminum Seal Co., New Kensington, Pa., announces that Frank D. Goll has been appointed sales manager. He was formerly assistant product manager in the sand and permanent mold castings division at the company's Cleveland works.

Cherry-Burrell Corp., Chicago, plans a 50 percent increase in plant facilities for the manufacture of modern dairy plant equipment. The expansion includes a new factory at Cedar Rapids, Iowa, the acquisition of a new plant in Little Falls, N. Y., to supplement the existing plant and expansion of the Milwaukee factory.

Continental Can Co., Inc., has broken ground for a new can plant in a model industrial community in Sacramento, Calif. The company also soon will build modern can making plants in Pittsburgh and in Weirton, W. Va.

Dearborn Chemical Co., Chicago, has announced the appointment of F. E. Rolston as packaging engineer. Since 1942, Mr. Rolston has been with the government as an industrial specialist under the Forest Products Laboratories.

Merck and Co. has been awarded the Army-Navy "E" for the fifth time at its plants in Rahway, N. J., Philadelphia, Pa., and Elkton, Va. Buffalo Pumps, Inc., Buffalo, was awarded its fifth white star and Infilco Inc., Chicago, received a third star recently.

William M. Rand recently was elected president of Monsanto Chemical Co., St. Louis, succeeding Charles Belknap who will continue with the company as chairman of the executive committee. Mr. Rand has been a vice-president of Monsanto since 1937.

Reynolds Research Institute, research subsidiary of Reynolds Metals Co., is now under the direction of Reid B. Gray with headquarters in Glen Cove, N. Y. and Richmond, Va. Mr. Gray succeeds Dr. Warren J. Mead, who resigned to give more attention to his duties as head of the Geology Department of Massachusetts Institute of Technology. Dr. Mead will continue with the Reynolds Company as a consultant.

Shellmar Products Co., Mt. Vernon, Ohio, has announced the appointments of T. R. Baxter as package development manager. He has been with Standard Brands in a similar capacity for the past twenty-five years.

Swift Canadian Co., Ltd., is preparing facilities at the Toronto plant for the manufacture of bone glue and other glue and adhesive products.

FOOD EQUIPMENT NEWS

Vertical motor.

Vertical Motor

CROCKER-WHEELER division of Joshua Hendy Iron Works, Ampere, N. J., announces a vertical drip-proof motor rated at a 40-deg. C. temperature rise on continuous duty, with a 15 percent service factor. It is designed for operation from 60- or 50-cycle, three- or two-phase circuits at all standard voltages. All ventilating openings of this new line of motors are shielded against the entrance of dripping liquids and falling particles. Oversize ball bearings are provided to carry thrust in addition to the rotor, and a centrifugal bearing seal permits the use of softer grease. A new recessed junction box, which provides ample room for making electrical connections, is employed in the motor's design. The rotor, bars, fans and end rings are cast in one operation from aluminum alloys. Other features include a heavy cast-frame construction and coils protected with "Vinylastic" insulation.

Accordion Conveyor

A PORTABLE accordion-type conveyor has been made available by Food Machinery Corp., Riverside, Calif. It is claimed that the unit can be set up by one man. It comes in open lengths of 60 or 100 in., and can be folded like an accordion to 21 or 35 in. The shorter section has four telescopic legs; the longer, six telescopic legs. Another feature is the split rollers which come in widths of 10 to 18 in. With the rollers split in two, material traveling down the conveyor is said to take S-turns without falling off. Each roller is built to carry a load up to 80 lb.

Pressure Shaft Seal

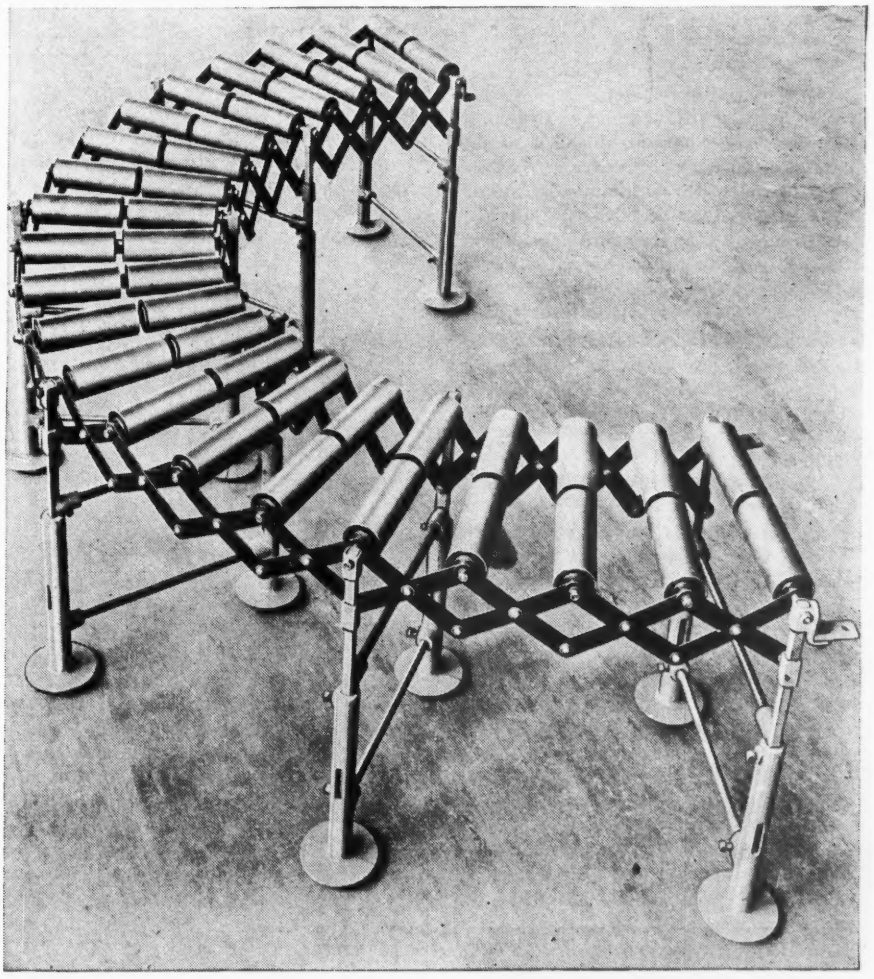
SANITARY and noncorrosive seals for horizontal centrifugal pumping units are announced by Jet Shaft Seals, Inc., 1452 S. San Pedro St., Los Angeles 15, Calif. The company states that a large percentage of pump maintenance costs is saved by eliminating waste of fluid, packing expense and sleeve and shaft wear. In principle, the seal draws pressure from the high point and directs it back into the low pressure area of the pump with sufficient force to seal off internal pressure. Seals are available in sizes for all pumps with a 1-in. shaft and over.

Combustibles Controller

AN automatic analyzer and recorder which controls the combustibles content of a gaseous mixture has been developed by the Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, Ohio. The analyzer and recorder is said to provide a continuous graphic analysis almost instantly, and to be responsive to changes of 0.05 percent of combustibles. Accuracy is said to be within 0.25 percent.

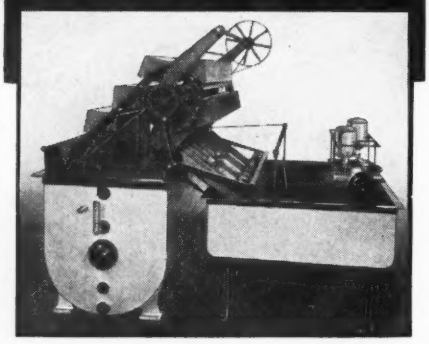
The unit operates as follows: A continuous gas sample is mixed with compressed air and burned on a catalyst filament which reaches a temperature proportional to the combustibles content. Since the filament resistance is a function of temperature, a simple resistance bridge connected to a null-balance electronic recorder completes the installation. It may be calibrated in percent combustibles, mixture ratio or other desired terms.

Pneumatic control or electric



Portable accordion conveyor.

Bottle Cleaners



adaptable to your layout

For continuous production in your bottling department, it will pay to investigate the many types of automatic bottle cleaners which we furnish—for any desired capacity—for any size container within reason. Each machine is built to provide highest efficiency for its particular requirements with a minimum of well constructed, easily accessible operating parts.

Installations in all principal cities

Each cleaning problem deserves separate consideration. Competent field engineers will thoroughly analyze your needs, furnish all necessary layout drawings and specifications to assure absolutely clean and sterile bottles or jars when the installation is made. Shown above is a single compartment soaker, designed to process many odd shaped containers at low capacities.

Consult our representatives or write today, stating your process requirements. Study our technical bulletins on all types of bottle cleaning units.

BARRY-WEHMILLER MACHINERY COMPANY

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ARMY (E) NAVY

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New York
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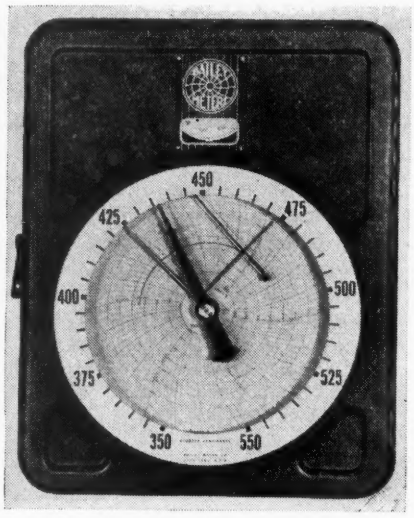


Combustibles recorder-controller.

alarm contacts may be provided on both one- and two-pen recorders. A two-pen recorder utilizes separate analyzers so that the speed is not impaired by switching, and the records made by the instrument are independent of each other.

Combustibles recorder-controllers applied to process furnaces operating with reducing atmospheres are said to permit finer measurement and control than has heretofore been considered possible. This is said to result in greater uniformity and higher quality of product. In addition the company claims it greatly increases furnace economy. Variable fuel capacity is said not to affect the accuracy of control on installations of this type.

Foamglas Improved

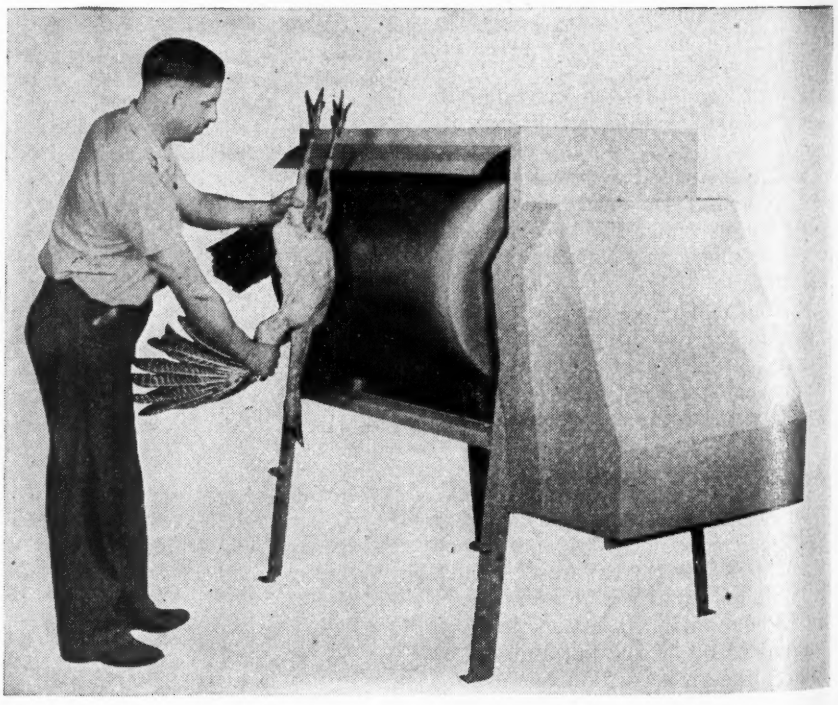
SEVERAL improvements in the new cellular glass insulation, Foamglas, have been made recently, according to Pittsburgh Corning Corp., Pittsburgh, Pa. One change increases the number of cells per cubic foot from 5,000,000 to 10,000,000, providing additional thermal protection. The "K" value, or conductivity, of the new Foamglas is 0.40 B.t.u. per hr. per sq. ft. per deg. F. per in. at 50 deg. F. and 0.55 B.t.u. at 300 deg. F.

The improved product also has a different color, being brown instead of black.

Being composed of specially prepared glass, cellulated under intense heat, Foamglas is fireproof, waterproof, and vermin-proof. It is not subject to deterioration from common elements.

Poultry Picker

FEATHERS and pin feathers on poultry are removed by an automatic poultry picker made by the Mueller Products Co., Cleveland, Ohio. The fowl is held against a drum revolving at approximately 300 r.p.m. About 550 rubber fingers project from the drum, these being flexible to follow the contour of the bird. They are said to remove pin feathers, as well as feathers. Scalding is necessary to prepare the birds for picking, the poultry being immersed for the proper time in water at 120 deg. F.



Automatic poultry picker.

HANDLING + Processing + HANDLING + Assembling + HANDLING + Packing + HANDLING + Storage + HANDLING

HANDLING—the Common Denominator of PRODUCTION

LET MEN DIRECT POWER—NOT GENERATE IT!

Cubic transportation—Lifting and placing as well as carrying—is essential to efficient handling. *Where* a product is handled is just as important as *how* it is handled.

Towmotor, capable of moving materials in any plane from floor level to a 20 foot height, provides a means of utilizing all available space. The Towmotor DATA FILE contains details. Your copy is ready now.

TOWMOTOR

THE ONE-MAN-GANG

TOWMOTOR CORPORATION • 1222 E. 152ND STREET, CLEVELAND 10, OHIO

FOR
Fine SEPARATIONS
OR
Coarse SCALPING

BAR-NUN *Rotary Sifters*

The Bar-Nun Rotary Sifter is a sturdy, compact unit, that will efficiently handle many of the sifting, separating or grading jobs in a food processing plant.

Whether your present requirement is for fine separations or coarse scalping, there's a standard Bar-Nun available. Sizes range from 4 to 60 square feet of cloth surface with capacities ranging from several hundred pounds to several tons per hour.

Specify your Sifter requirements and we'll specify the Bar-Nun best suited to meet them. Complete information on request—write today.

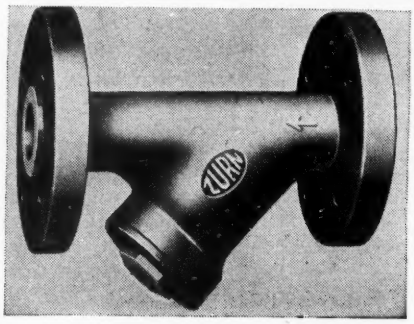
MADE BY:
B. F. Gump Co.
Established 1872
454 SO. CLINTON STREET
CHICAGO 7, ILL.

MAKERS OF: Equipment for Grinding, Mixing, Feeding, Sifting, Weighing or Packing of Dry Food Products.

★

"Y" Strainer

FOR uses in places where vibration exists, J. A. Zurn Manufacturing Co., Erie, Pa. has designed a "Y" strainer that will not get out of place. This unit is designed with a snug-fitting strainer sleeve. When service conditions require, the strainer basket can be magnetized for intercepting metal particles which might otherwise be ruinous to valve seats and vital parts of operating pipeline equipment.



Improved "Y" strainer.

All units are hydrostatically tested according to the service pressures under which they are required to operate. They are available with or without a cleanout plug, or can be furnished with a threaded blow-off connection. They are manufactured in cast bronze, steel, semisteel or cast iron. A wide range of sizes is available for flanged, welded or threaded connections.

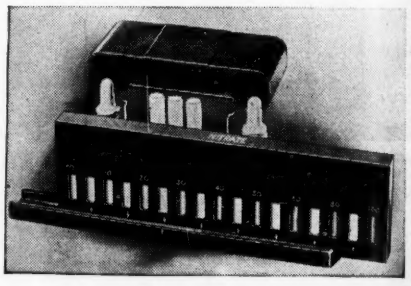
Bucket Carrier

A MOTOR-DRIVEN cab-operated double bucket carrier has been developed by Cleveland Crane & Engineering Co., Wickliffe, Ohio. It is intended for the transportation of dry bulk materials. The operation of the carrier and the opening and closing of the bucket gates are handled by the cab operator, who sits on a swivel chair, enabling him to work in the direction of either bucket. A single variable-speed drum controller is located on one side of the cab. Two foot brakes are provided, one at either end, so that one is always in convenient reach of the operator, regardless of the direction in which he may be operating the carrier. Push-pull levers for opening the bucket gates extend into the cab and permit emptying the materials in any amounts and at any rate desired.

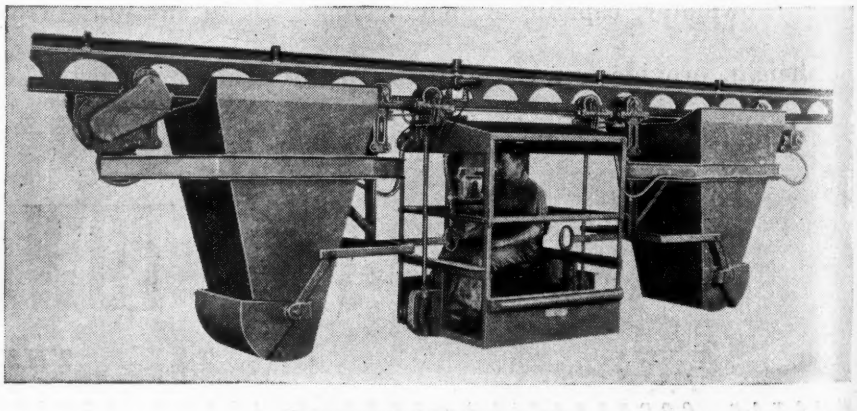
The carrier is provided with two motorized travel drives, one at each end. It operates at speeds up to 600 ft. per minute.

Slide Comparator

DESIGNED to determine nitrate concentrations of boiler water—where nitrate-hydroxide ratios are maintained to control tendencies toward caustic embrittlement — is a slide comparator marketed by W. A. Taylor & Co., 7300 York Road, Baltimore 4, Md. The set consists of a pH slide comparator base, a color standard slide with nine standards representing from 0 to 100 in 10-p.p.m. steps of nitrate as NO_3. With it also are five 5-ml. test tubes, two vials of Brucine reagent, a pipette and 16 oz. of concentrated sulphuric acid, as well as a 10-ml. graduate and 100-ml. beaker. The accuracy of the method is said not to be affected by ions normally present in boiler water, such as phosphate, sulphites, silicates, chlorides and so forth.



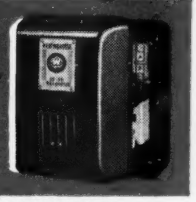
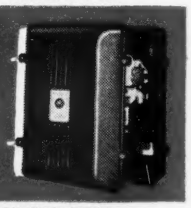
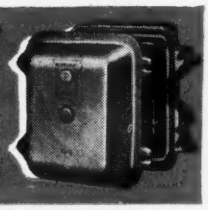
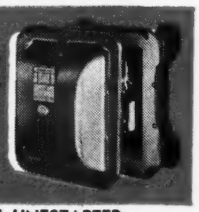
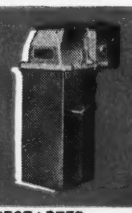
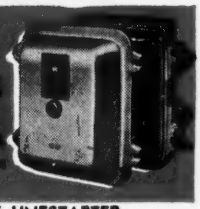
Slide comparator.



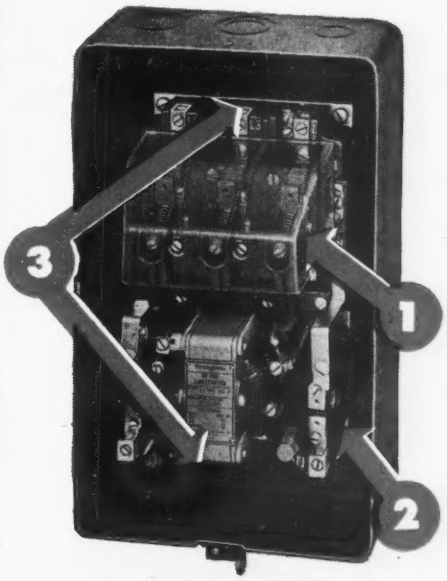
Cab-operated bucket carrier.

Pick this enclosure.....for this magnetic motor starting job

....get these Westinghouse Starter features!

NEMA TYPE I **STANDARD SHEET STEEL ENCLOSURE**		**GENERAL-PURPOSE INDOOR APPLICATIONS** —normal atmospheric conditions
CLASS 11-200-S LINESTARTER		
NEMA TYPE I-A **SEMI-DUST-TIGHT SHEET STEEL ENCLOSURE** (Felt gasket between cover and case)		**GENERAL-PURPOSE INDOOR APPLICATIONS** —where some protection against dust is necessary
CLASS 11-200-V LINESTARTER		
NEMA TYPE V **GASKETED DUST-TIGHT SHEET STEEL ENCLOSURE** (Sponge rubber gasket)		**DUSTY LOCATIONS** • Steel mills • Cement mills • Textile mills • Woodworking plants
CLASS 11-200-T LINESTARTER		
NEMA TYPES III and IV **WATERTIGHT and DUST-TIGHT CAST-IRON ENCLOSURE**		**WET LOCATIONS** • Docks • Canal locks • Subways • Tunnels • Dairies • Breweries
CLASS 11-200-W LINESTARTER		
NEMA TYPE VII **CAST-IRON ENCLOSURE FOR HAZARDOUS LOCATIONS** Class I, Group D (Ground flanges on cover and case)		**HAZARDOUS LOCATIONS** • Refineries • Distilleries • Varnish plants • Spray painting shops
CLASS 11-200-U LINESTARTER		
NEMA TYPE VIII **OIL-IMMERSED ENCLOSURE**		**HAZARDOUS LOCATIONS** as above, also corrosive atmospheres • Tanneries • Pulp mills • Fertilizer plants • Chemical plants
CLASS 11-202 LINESTARTER		
NEMA TYPE IX **CAST-IRON ENCLOSURE FOR HAZARDOUS LOCATIONS** Class II, Groups E, F & G (Ground surfaces between cover and case)		**HAZARDOUS LOCATIONS** • Flour mills • Grain elevators • Sugar, cocoa, coal pulverizing plants • Aluminum and magnesium processing plants
CLASS 11-200-Y LINESTARTER		

1. **"De-ion" Arc Quenchers.** Arcs go out *quick*, making contacts last longer.
2. **Bi-Metal Overload Relay.** Accurate calibration for life of starter. Permits harmless overloads—protects motor against dangerous running overloads or stalled rotor conditions.
3. **Straight-Through Wiring.** All wiring front-of-panel. Ample wiring space.



See your Westinghouse Distributor or write for D. B. 11-200. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-60615

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

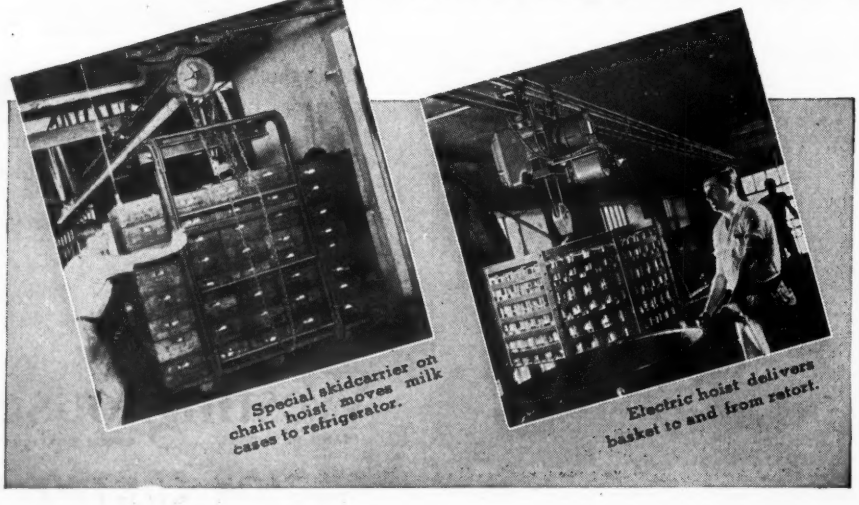
MOTOR CONTROL

From SMOKING SAUSAGE
Racks of sausages are easily moved into smoke ovens.
To RIPENING BANANAS
2-way switch for handling bananas in and out of ripening room.

AMERICAN MONORAIL Overhead Handling Systems have a universal range of uses in the food processing industry. From receiving room to shipping room there is American MonoRail equipment that does the job of handling better, quicker and more economically. You can speed up production, eliminate all manual handling and rehandling, move materials on quick accurate schedules, and do it at a great savings in cost. Let an American MonoRail Engineer show you "all round savings" with this equipment—write today!

THE AMERICAN MONORAIL COMPANY

13125 ATHENS AVE. ● CLEVELAND 7, OHIO


Special skidcarrier on chain hoist moves milk cases to refrigerator.
Electric hoist delivers basket to and from retort.

Vacuum gage with vapor trap.

Portable High-vacuum Gage

ANNOUNCEMENT is made by F. J. Stokes Machine Co., Philadelphia 20, Pa., of a completely redesigned, McLeod-type, portable, high-vacuum gage with built-in condensable-vapor trap. Accurate readings are said to be within micron range, even when condensable vapors—such as those of water, oil and alcohol—are present in the vacuum system. This is accomplished by means of a compact, renewable chemical cartridge which absorbs all such vapors. A change of color in the chemicals indicates when they are saturated and cartridge renewal is necessary. This is said to be necessary only after several months of service, in most applications.

Motorized Truck

TWO TONS is the rated capacity of a motorized truck built by Lift Trucks, Inc., 2425 Spring Grove Ave., Cincinnati 14. Heavy loads are placed on the truck by hand, crane or otherwise. This is not a lift truck.

Finger-tip control is said to permit easy maneuvering of the heaviest load, forward or backward. It consists of two buttons on the handle, one for forward motion and one for reverse. The truck also has dynamic brake control. Forward or reverse speeds of 312 ft.

Motorized truck.

Imagination IN PACKAGING

Here is another of tomorrow's "hard to believe" packages . . . the result of Shellmar imagination and experience. Although materials are not yet available, it is not too soon to look ahead, plan ahead to the use of this package. Made of a heat-sealable, water-vapor-proof material, this new package holds perishable foods in a suspended atmosphere which prevents evaporation of natural juices and retains original freshness for many months. If you have a problem of protecting freshness, taste and color, contact Shellmar today.

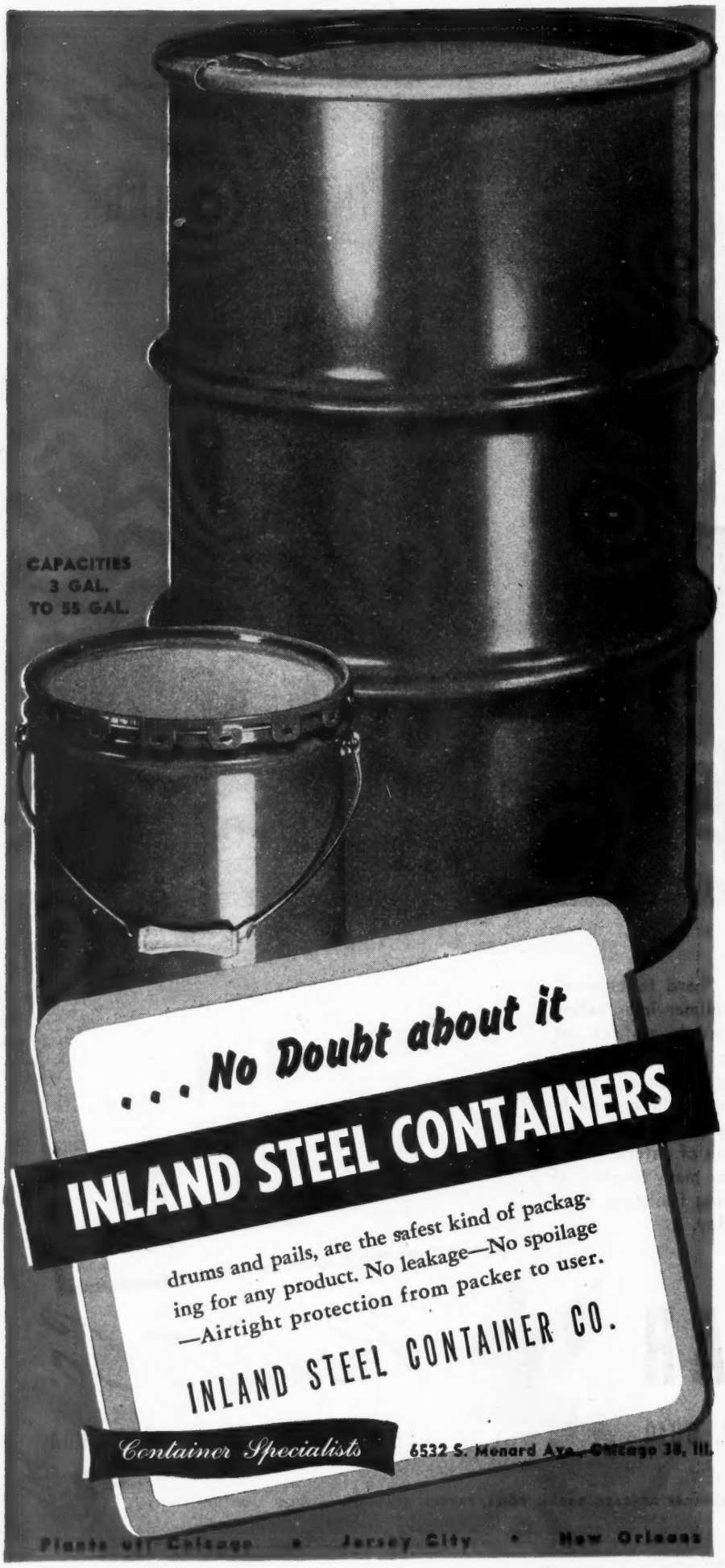
FOR EVERY PRODUCT YOU'LL FIND THE RIGHT PACKAGE AT SHELLMAR

SHELLMAR *Products Co.*

MT. VERNON, OHIO

Chicago • New York • Pasadena

CONVERTERS OF CELLOPHANE, PLIOFILM, CELLULOSE ACETATE, SARAN, FOILS, PAPERS, GLASSINE, LACQUER COATINGS, VINYLS


CAPACITIES
3 GAL.
TO 55 GAL.
. . . No Doubt about it
INLAND STEEL CONTAINERS
drums and pails, are the safest kind of packaging for any product. No leakage—No spoilage
—Airtight protection from packer to user.
INLAND STEEL CONTAINER CO.
Container Specialists
6532 S. Menard Ave., Chicago 38, Ill.
Plants at Chicago • Jersey City • New Orleans

per minute when empty and 220 f
per minute loaded are standar
Power is supplied by heavy-du
batteries, which users say opera
10 to 20 hours under maximum lo
without recharging.

The frame is of all-steel co
struction, with parts standardize
and interchangeable. Welding
limited to low-stress parts. Impo
tant wearing points are hardene
Wheels are steel castings wi
sealed ball bearings with rubber
other protective treads as desire

Feed Regulator

HAMMER MILLS, attrition mills a
cutters are said to be able to hand
full production loads when equipp
with a new electronic feed regulat
put out by Mosher Electronic Co
trols, 130 West 42nd St., New Yo
18. It maintains the load on pu
verizing equipment at the max
mum rated capacity of the co
nected motor, and production

Electronic feed regulator.

kept at the peak rate continuous
Improved design prevents m
mentary overloads from actuati
or disturbing the feed control rel
An underload light signal indicat
failure of the material to reach t
pulverizer due to empty bins
arching at some point in the fl
line above the feeder. Addition
light or sound signals can be wir
to any required location.

Hydraulic Transmission

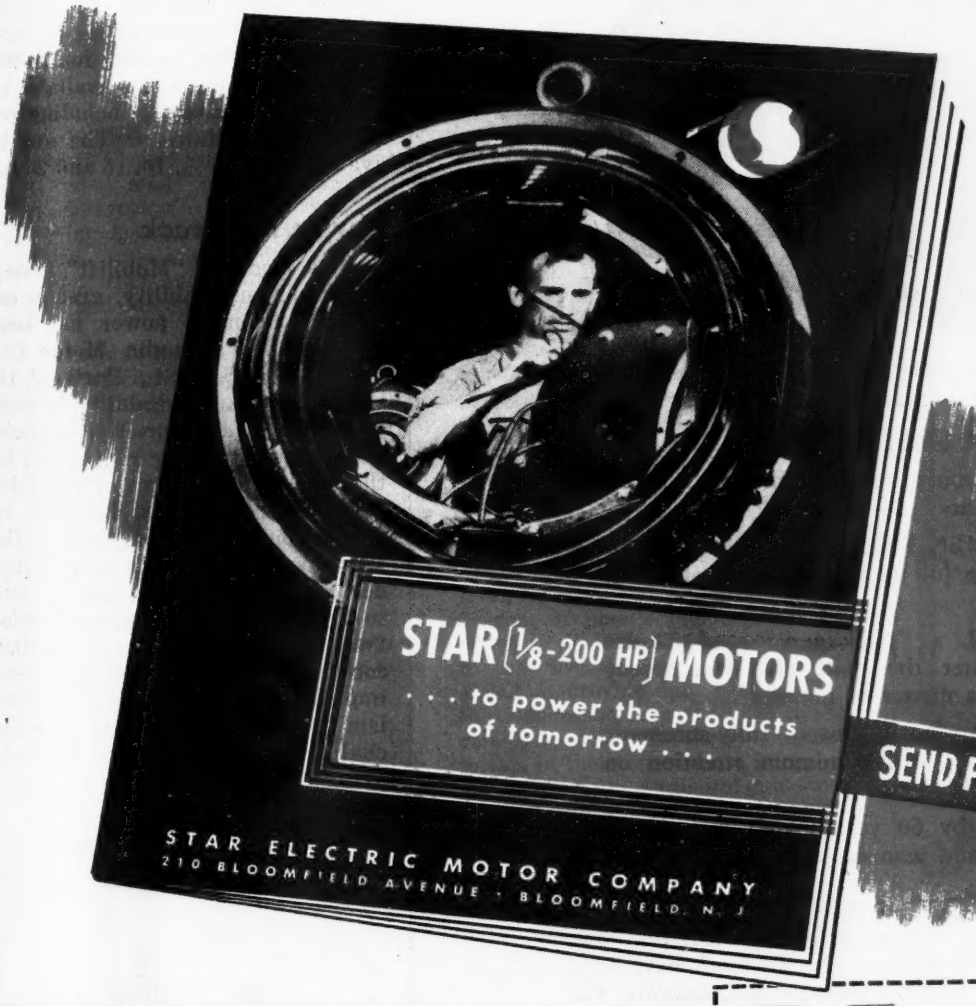
THE Model HT-1 hydraulic va
able-speed transmission of t
heavy-duty type and intended f
all kinds of industrial application
is a new development by Portm

A New kind of DIGEST FOR MOTOR BUYERS

IT'S DIFFERENT because it doesn't attempt to give you a lot of general technical data about motors and motor selection.

This eight-page file-size folder assumes that you know what type of motor you need. It was designed to tell you, quickly, about STAR as a source of motors and generators. It shows what sizes and types are built by Star. It describes Star's way of working with customers . . . how Star becomes their "Motor Department". It gives facts about Star's pioneer achievements in motor design. It names many hard-to-satisfy motor buyers who are long-time customers.

To bring your file on leading motor sources up-to-date . . . to learn why so many prominent concerns are turning to Star Motors to power their products and production . . . attach the coupon below to your letterhead. It will also register you to receive the Complete Catalog which is in preparation.


STAR (1/8-200 HP) MOTORS
. . . to power the products of tomorrow . . .
STAR ELECTRIC MOTOR COMPANY
210 BLOOMFIELD AVENUE · BLOOMFIELD, N. J.

SEND FOR YOUR COPY

STAR MOTORS

POWER PACKAGED AS YOU NEED IT

STAR ELECTRIC MOTOR CO.,
238 Bloomfield Avenue
Bloomfield, N. J.

☐ Send 8-page bulletin about Star Motors

☐ Put me on list to receive Complete Catalog

Name and position.....

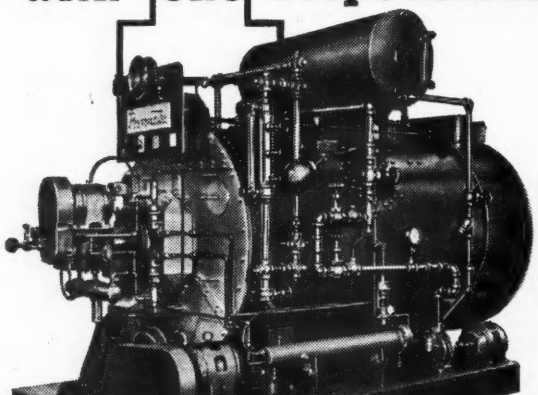
Company.....

Address.....

.....

O&S Powermaster
-A COMPLETE POWER PLANT

in one unit . . .
from one source . . .
with one responsibility



Here's how to solve all your steam generating problems without moving away from your desk!

HAVE ONE OF OUR ENGINEERS:

1. CHECK your present and future steam requirements . . .
2. RECOMMEND the proper size generator to do the job most efficiently, at lower cost . . .
3. INSTALL a "packaged" ready-to-use Powermaster that will give you speedy steam in a matter of minutes . . .
4. SERVICE this compact, fully-automatic power plant with minimum attention on your part!

He's backed by 60 years of O & S boiler engineering and manufacture.

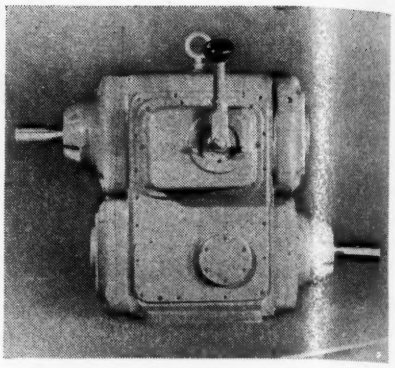
GET A POWERMASTER UNIT . . . or bulletin for further information from Orr & Sembower, Inc., 932 Morgantown Rd., Reading, Pa.

ORR & SEMBOWER INC.

READING O&S PENNA.

Builders of Better Boilers Since 1885

*T. M. REG. U. S. PAT. OFF.

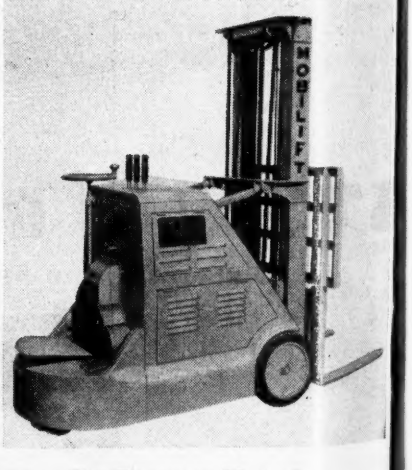


Hydraulic variable-speed transmission.

Machine Tool Co., 70 Portman Road, New Rochelle, N. Y. Speeds are said to be instantly available from zero or full neutral position to maximum motor speeds both forward and reverse. In this drive, torque output remains constant at all speeds. Various types of control mechanisms, in addition to the hand lever shown, are available to suit all applications, including remote control stations. The unit is available in 5, 7½, 10, 15 and 20 hp.

Power Lift Truck

A NEW model of "Mobilift" having better maneuverability, greater capacity and more power has been developed by Vaughn Motor Co., 835 S. E. Main St., Portland 14, Ore. The maneuverability is made possible by the compact proportions and shorter turning radius and by the fact that the operator can drive forward or backward instantly by the action of a single lever. The truck is equipped with a two-cylinder air-cooled engine, and is said to operate easily on ramps graded from 10 to 20 percent. Lifting convenience and capacity have been improved by a telescopic mechanism operated by two sets of roller chains with an ultimate strength of 8,500 lb. each.



Gasoline-power lift truck.

CATALOGS, BULLETINS

FOOD PLANT EQUIPMENT

Frick Freezing Systems – Bulletins 147-A and 148-C describing various installations of Frick freezing equipment have been made available by Frick Co., Waynesboro, Pa. In addition to describing the various installations, the bulletins are well illustrated with photographs.

Fine-dust Collector – The problem of efficient fine-dust collection is dealt with in Bulletin No. 101 issued by Thermix Engineering Co., First National Bank Building, Greenwich, Conn. Included are precipitating tests on various powdered foods and chemicals.

Processing Equipment – Artisan Metal Products, Inc., 211 Congress St., Boston 10, Mass., has issued an 8-page bulletin in which are described and illustrated many pieces of processing equipment built by them. Tanks of varying descriptions and materials are shown. Industrial piping, coils and bends, stills and columns of various sizes and descriptions are included.

Steam-jet Ejectors – Single-stage steam ejectors are described in Bulletin No. 6509 issued by Ross Heater & Mfg. Co., Inc., 1443 West Ave., Buffalo 13, N. Y. Among the features of this bulletin are: cross sectional drawings showing materials of construction; engineering data; a table of ejector capacity; formulas and a table of air-vapor mixture ratings; an engineering curve showing mixture ratios for saturated air; data for selecting the correct steam jet ejector; dimensional drawings; and a complete table of sizes, dimensions and weights.

Centrifugal Pump – The LaBour Co., Inc., Elkhart, Ind., has published Bulletin No. 51 which describes the Type G Pumps. These are packingless, self-priming centrifugal pumps. How the pump primes itself is shown by drawings and described in the text.

Oil Burners – Bulletin No. 109 issued by Peabody Engineering Corp., 580 Fifth Ave., New York 19, describes a wide-range oil burning system. It explains how the system achieves efficient combustion over a range in capacity as great as 50 to 1. The system is said to control any number of burners throughout all variations in capacity.

Canning Machinery – Food Machinery Corp., Hoopeston, Ill., has a new catalog No. 700 ready for distribution. It is profusely illustrated with photographs of the company's general line of canning equipment. In addition, there are flowsheets of typical machinery installations for the canning of corn, peas, whole tomatoes and string and wax beans. Also covered is a fairly complete line of control instruments and general canning-plant supplies.

Valves and Fittings – The Alloy Steel Products Co., Inc., Linden, N. J., has just made available a catalog on valves and fittings which every engineer and food technologist will want. It covers practically all of the common types of valves, such as gate, needle, globe, check, angle and Y valves. In addition to giving valuable information on the metallurgical and mechanical properties of the various alloys used, the booklet is replete with drawings of the various valves. In most cases, a whole page is given to one valve. As an example, under "gate valves" there are 20 pages covering this one type of valve alone.

PLANT SUPPLIES

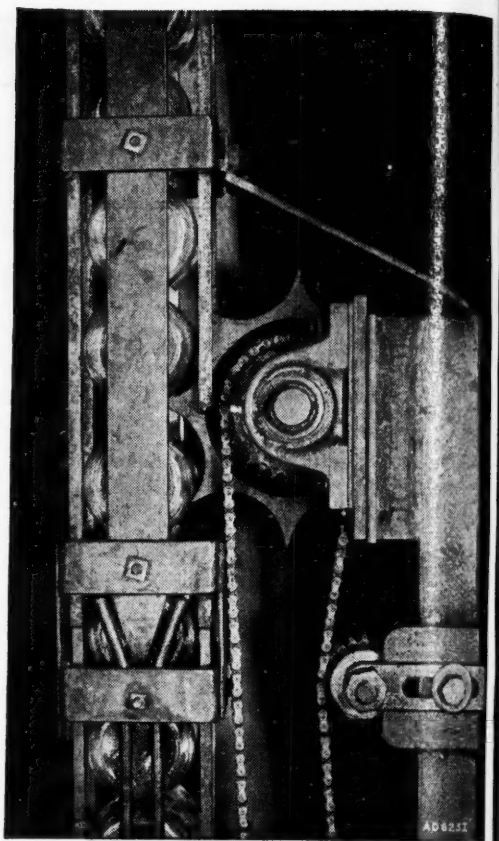
Paper Cartons – Bloomer Bros. Co., Newark, N. Y., has issued a beautifully illustrated booklet covering the entire process of making paper box specialties. Each operation from the original carton design right through to the making of the paper and completion of the carton itself is shown largely by photographs of the various operations. While some text is given, the photographs show the operations so vividly that one has no difficulty in understanding the entire process.

Plastics Classification Chart – Society of the Plastics Industry, 295 Madison Ave., New York 17, has issued a classification of plastic molding materials which is made available upon request to the Society. The classification is aimed to provide data comparable to that which has been available to those employing wood, metals and other materials in their operations. It presents in chart form an authentic guide to the various properties of plastic molding materials, as established by the material makers and molders. Both thermosetting and thermoplastic materials are included, and values are shown for their mechanical, electrical, optical, thermal, chemical and aging properties.

Diesel-engine Data Sheet – Released by Viking Instruments, Inc., Stamford, Conn., is Data Sheet R-18 describing the safety control system for the shutdown of diesel engines when the temperature of the water circulating system becomes too high, or when there is insufficient lubricating oil pressure. The Data Sheet contains complete information on operation, with detail drawings of general arrangements, installation and operating instructions.

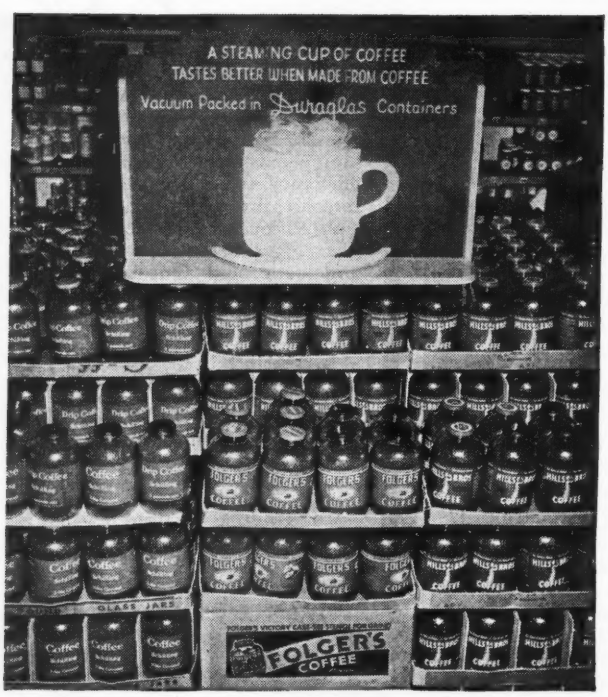
KILLS
PLANT MAINTENANCE ENEMIES
RUST
FUNGUS
DINGE
LIQUID PORCELAIN-LIKE
DAMP-TEX
DAMP-TEX SYSTEM O ET SURFAC PAINTING
Damp-Tex super-enamel can be applied to surfaces despite moisture, heat, fumes and many other extreme conditions. Its water-proof film retards deterioration, increases efficiency, turns depressing, dingy interiors into gleaming, porcelain-smooth beauty. Resistant to fungus, 2% caustic solution, steam and lactic acid. One coat covers. Comes in white and colors. Used in over 4000 plants. Write for our trial offer.
Proved Fungus Resistant by FUNGUS TEST
Proved Lactic Acid Resistant by ACID TEST
LIQUID PORCELAIN-LIKE
DAMP-TEX FOR
WET
OR DRY SURFACES
STEELCOTE MFG. CO.
ST. LOUIS 3, MO.
Canadian Manufacturer:
Standard Paint & Varnish Co.,
Windsor, Canada

PROFIT FROM THESE 3 WAY LIFTS FOR THE LONG PULL AHEAD



LIFTS TO PRODUCTION

This Flowwheel is a traffic cop on a gravity drop! That's what the starwheel in the picture above became when mounted vertically as shown. It is driven from the filler and indexes one jar for each jar that enters the filler. We make no packing or conveying machinery. But often from our broad experience, we are able to suggest simple improvements that speed up operations for Duraglas container customers.



LIFTS TO DISTRIBUTION

Displays in Duraglas Containers turn buying impulses into impulse purchasers. A huge, steaming cup of coffee—a mass display of vacuum-packed coffee in glass containers at the Grand Central Market at 2435 California Street, San Francisco, California and—market officials report an increase of 52% in coffee sales.

LIFTS TO CONSUMPTION

House-to-House, Door-to-Door, marches a steady procession of messages about Duraglas Containers—messages steadily increasing preference for products packed in glass. Duraglas container advertisements in full color appear in the Saturday Evening Post, Collier's, Good Housekeeping, Parents' and Sunset Magazines—all creating buying impulses for products packed in Duraglas Containers.

OWENS-ILLINOIS GLASS COMPANY
TOLEDO 1, OHIO
Branches in All Principal Cities

Duraglas
TRADE MARK REG. U.S. PAT. OFF.
CONTAINERS
Preserve, Protect and SELL BY SIGHT

BOOKS

Jobs for Vets

JOB OPPORTUNITIES FOR THE VETERAN IN THE WHOLESALE ICE CREAM INDUSTRY. Published by International Association of Ice Cream Manufacturers, 1105 Barr Bldg., Washington, D. C., 1945. 6x9 in.; 28 pages; paper. Price, 10 cents to members.

This little booklet is addressed to the returning veteran. It tells him just about all there is to know of the ice cream industry—past, present and future.

Through statistics, the booklet shows the tremendous growth of the ice cream production from 148,298,000 gal. in 1920 to 462,308,000 gal. in 1942. As soon as dairy products and sugar are available, the industry will continue toward its goal of 1,000,000,000 gal. annually. Whether the veteran is an accountant, chemist, bacteriologist, engineer or salesman, his place in this industry is outlined.

National Canners

CANNERS DIRECTORY—1945. Compiled by the National Canners Association, 1739 H St., N. W., Washington, D. C. 5¾x9 in.; 164 pages; cloth. Price, $2.00 to non-members, free to members.

This convenient directory again lists the nation's food canners by states and identifies the items produced by each canner. It also includes officials of state and local associations, members of the Canning Machinery and Supply Association and members of the National Food Brokers Association.

Such a directory, close at hand, will save many a time consuming search for an elusive address, corporate name or product manufacturer.

Automatic Control

PRINCIPALS OF INDUSTRIAL CONTROL. By Donald P. Eckman. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1945. 5½x8½ in.; 23[illegible] pages; cloth. Price, $3.50.

Because the literature on the subject was so widely distributed, this book was prepared as an introduction to the science of automatic control. It offers a practical and comprehensive discussion of controller characteristics and of the effects of process load changes and valve design. Correlated and multiple control systems are covered. The underlying principles with which the food engineer must be familiar, in order to handle the mechanisms of this highly important instrumentation, are thus made available.

The complete industrial automatic control system is divided into four elements: The measuring means, the controller mechanism, the final control element and the process. The job done here has been to coordinate the scattered information into a clear and logical whole. The result is the presentation of the important laws of operation of such systems, along with a practical background of theory.

Catalysis Catalyst

CATALYTIC CHEMISTRY. By Henry William Lohse. Published by Chemical Publishing Co., 234 King St., Brooklyn 2, N. Y., 1945. 5¾x8¾ in.; 471 pages; cloth. Price $8.50.

While aiming at a factual presentation of the underlying principles of catalytic phenomena, the author also presents catalytic reactions as applied to industrial process. A separate section is devoted to each of the various types of catalytic reactions. And industrial catalytic reactions, along with the nature and properties of catalysts, are discussed in detail.

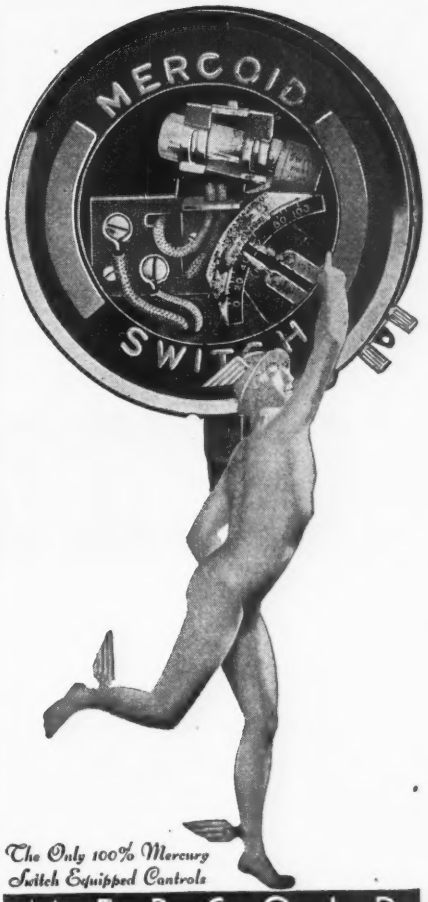
The food chemist will be interested in the section on catalytic hydrogenation of vegetable and animal oils and fats, which brings together much information that previously has been scattered throughout the literature.

GOVERNMENT PUBLICATIONS

WATER LEVELS AND ARTESIAN PRESSURE IN OBSERVATION WELLS IN THE UNITED STATES IN 1943. Part 2. Southeastern States. By O. E. Meinzer, L. K. Wenzel and others. Geological Survey Water-Supply Paper 987. Available from Superintendent of Documents, Washington 25, D. C. Price 35 cents.

THE CASTOR-BEAN PLANT AS A SOURCE OF INSECTICIDES, A REVIEW OF THE LITERATURE. By N. E. McIndoo. Bureau of Entomology and Plant Quarantine. E-666. Mimeographed. Available on request to Bureau of Entomology and Plant Quarantine, Washington 25, D. C.

COMPOSITION AND NUTRITIVE VALUE OF PORK AS RELATED TO WEIGHTS OF ANIMALS AND CUTS. By O. G. Hankins and N. R. Ellis. Department of Agriculture, Circular 731. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents.



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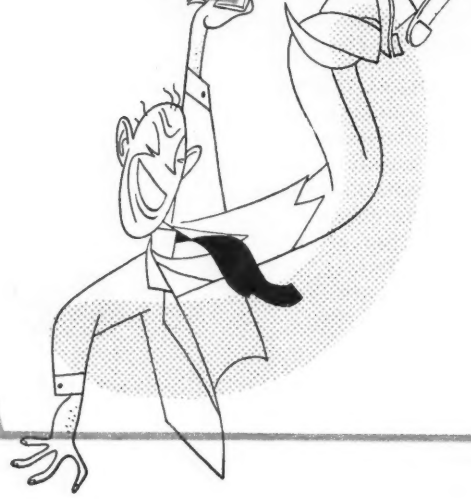

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PATENTS

BAKING

Bakery Doughs Leavened by Incorporation of Inert Gases Such as Dimethyl Ether and Methyl Chloride — Jacob Freilich, Bronx and Charles J. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,382,305. Aug. 14, 1945.

Cakes Mechanically Slit, Filled and Layered by Mechanical Means — William Wennmann, Baltimore, Md., to Ward Baking Co., New York, N. Y. No. 2,380,564. July 31, 1945.

Doughs Baked in Traveling-tray Oven Designed To Avoid Swaying of Trays or Shifting of Weight on Individual Trays While Moving Through Loading Baking and Unloading Zones of Oven — John R. Nalbach, Oak Park, and Adolph Haupt, Chicago, Ill., to Middleby-Marshall Oven Co., Chicago, Ill. No. 2,384,390. Sept. 11, 1945.

Dough Shaped and Divided by Mechanical Means — Irwin Elliott, Croton on Hudson, N. Y., to Krum-Elliott Co., New York, N. Y. No. 2,383,436. Aug. 28, 1945.

CANNING

Asparagus Spears Mechanically Graded for Size During Passage Over Cutting Knife —Albert R. Thompson, Los Gatos, and Richard D. Fox, San Jose, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,383,228. Aug. 21, 1945.

Berries and Similar Fruits Freed of Stems and Caps by Mechanical Means —Arthur H. Morgan, Knoxville, Tenn. No. 2,383,268. Aug. 21, 1945.

Canned Foods Preheated at Atmospheric Pressure and Retorted at Pressure Above Atmospheric During Continuous Downward Travel Through Processing Unit — Emile O. Mehline and Wm. Calvert, Seattle, Wash. No. 2,385,828. Oct. 2, 1945.

Foods Surface-treated With 10 Percent Acid Solution and Heated to Approximately 135 Deg. F. for Destruction of Sporogenic Bacteria — Henry A. Beecham and Frederick W. Fabian, East Lansing, Mich., to P. W. Bonewitz Co., Burlington, Iowa. No. 2,383,907. Aug. 28, 1945.

Pimento Mechanically Stuffed Into Olives — Mildred S. Ball, to Pacific Olive Co., Visalia, Calif. No. 2,384,429. Sept. 11, 1945.

CONFECTIONERY

Confectionery Strips Continuously Packaged in Laterally Spaced Relation to Each Other Between Continuous Protective Sheets and Separated From Each Other by Mechanically Inserted Continuous Groove-forming Dividers — George M. Schutter, to Schutter Candy Co., Chicago, Ill. No. 2,384,494. Sept. 11, 1945.

Chewing Gum Base Made From Polyvinyl Acetate and Polystryene, Terphenyl and Wax — Joseph E. Moose, Anniston, Ala., to Monsanto Chemical Co., St. Louis, Mo. No. 2,383,145. Aug. 21, 1945.

Chocolate Aerated During Vigorous Agitation To Improve Taste, Texture and Stability — Paul Hollstein, deceased, to J. M. Lehmann Co., Inc., New York, N. Y. No. 2,383,387. Aug. 21, 1945.

DAIRY

Dry Milk With Improved Properties Made by Condensing Fluid Milk to Have Solids-not-fat Content of at Least 20 Percent, and Superheating at Temperature Above 160 Deg. F. To Produce Slightly Toughened Curd Preparatory to Drying —Donald E. Mook, Perry, N. Y., to The Borden Co., New York, N. Y. No. 2,383,070. Aug. 21, 1945.

Organic Salts of Blood Sera or Concentrated Purified Sap From Immature Grasses and Leaves Added to Milk, Cream, Curd and Cheese to Increase Sensitivity of Reaction to Acidification, Curdling and Ripening — Georg Friedel, Dresden, Germany, to Alien Property Custodian. No. 2,385,569. Sept. 25, 1945.

DEHYDRATION

Dehydrated Foods With Fibrous Structure Heated to 150 to 165 Deg. F. and Compressed Into Blocks at Pressure Below 200 Lb. Per Sq. In. — John C. Donnelly, Greenwich, Conn., to Maguire Industries, Inc. No. 2,382,780. Aug. 14, 1945.

FATS AND OILS

Fatty Glyceride Treated With Low-molecular-weight Monohydric Alcohol in Presence of Catalyst to Form Glycerine and Esters of Fatty Acids and Subsequently Treated for Recovery of Glycerine and Esters of Fatty Acids and Subsequently Treated for Recovery of Glycerine — Clarence Joseph Arrowsmith, New York, N. Y., and John Ross, Ramsey, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J. No. 2,383,580. Aug. 28, 1945.

Fatty Glyceride Heat Treated With Monohydric Alcohol in Presence of Catalyst for Formation of Monohydric Alcohol Esters and Glycerine — Harold Dwaine Allen, Glen Rock, and William Ashley Kline, Morris Plains, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J. No. 2,383,579. Aug. 28, 1945.

Foods Having Glyceride Oil Content Stabilized Against Oxidative Deterioration by Addition of Small Quantity of Agent Obtained From Hops and Water-alcohol Soluble Extract of Hops — Carl W. Lindow and Joseph F. Thompson, to Kellogg Co., Battle Creek, Mich. No. 2,382,242. Aug. 14, 1945.

Oil Extracted From Avocados — Howard T. Love, Mayaguez, Puerto Rico, to People in the Territory of the United States. No. 2,383,398. Aug. 21, 1945.

Spices Crushed and Pressed To Lower Oil Content Preparatory to Fine Grinding of Cake; Pressed-out Oil is Restored to Powder — William A. Bush and Edward A. Lasher, to California Flaxseed Products Co., Los Angeles, Calif. No. 2,384,532. Sept. 11, 1945.

FREEZING

Food Units in Single Layer on Conveyor Agitated and Kept Separated During Continuous Passage Through Freezer — Frank W. Knowles, to Beltice Corp., Seattle, Wash. No. 2,386,140. Sept. 18, 1945.

FRUITS AND VEGETABLES

Cherries Declustered by Mechanical Means — Burton C. Coons, to Food Machinery Corp., San Jose, Calif. No. 2,382,184. Aug. 14, 1945.

Fresh Fruit Treated in Continuous Manner With Volatile Liquid Without Appreciable Loss of Liquid by Evaporation — Ogden S. Sells and Howard L. Porch, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,384,702. Sept. 11, 1945.

Fresh Fruits and Vegetables Given Protective Wax Coating Containing Ouricury Wax and Fatty Acid—Charles De Witt Cothran, to Brogdex Co., Pomona, Calif. No. 2,383,451. Aug. 28, 1945.

Fruits Cut and Juice Expressed in Combination Mechanical Unit — Nathaniel Eastman, New York, N. Y. No. 2,382,620. Aug. 14, 1945.

Fruits Mechanically Pitted — Burton C. Coons, San Jose, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,382,961. Aug. 21, 1945.

Fruit Tissue Other Than Pimento Processed for Use as Pimento Substitute—Edward Van Dellen and Richard N. Ball, Visalia, Calif. No. 2,382,682. Aug. 14, 1945.

Sweetening Constituents of Fruit Obtained by Pressing Finely Ground Fruit Pulp — Arvid M. Erickson, San Jose, and John D. Ryan, Campbell, Calif., to Barron-Gray Packing Co., San Jose, Calif. No. 2,382,407. Aug. 14, 1945.

MEAT AND POULTRY

Egg Yolks Separated From Whites and Graded as to Color — Leon D. Mink, to Industrial Patents Corp., Chicago, Ill. No. 2,382,737. Aug. 14, 1945.

Gelatine and Glue Made From Pork Skins, Hide Trimmings and Like With Aid of Urea, Thiourea and Formamide as Peptizing Agent — Donald P. Grettie, to Industrial Patents Corp., Chicago, Ill. No. 2,384,673. Sept. 11, 1945.

Liquid Egg Filtered During Passage Through Vibrating Screen Having 14 to 20 Wires Per Linear Inch — Frank B. Lomax, Chicago, Ill. No. 2,382,492. Aug. 14, 1945.

HOW TO SEPARATE A CAT FROM A MOUSE

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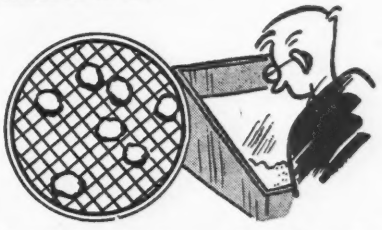

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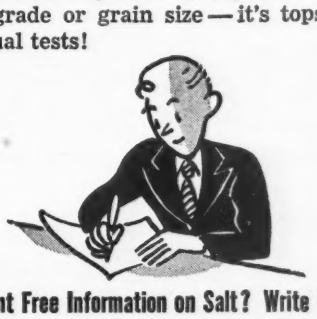

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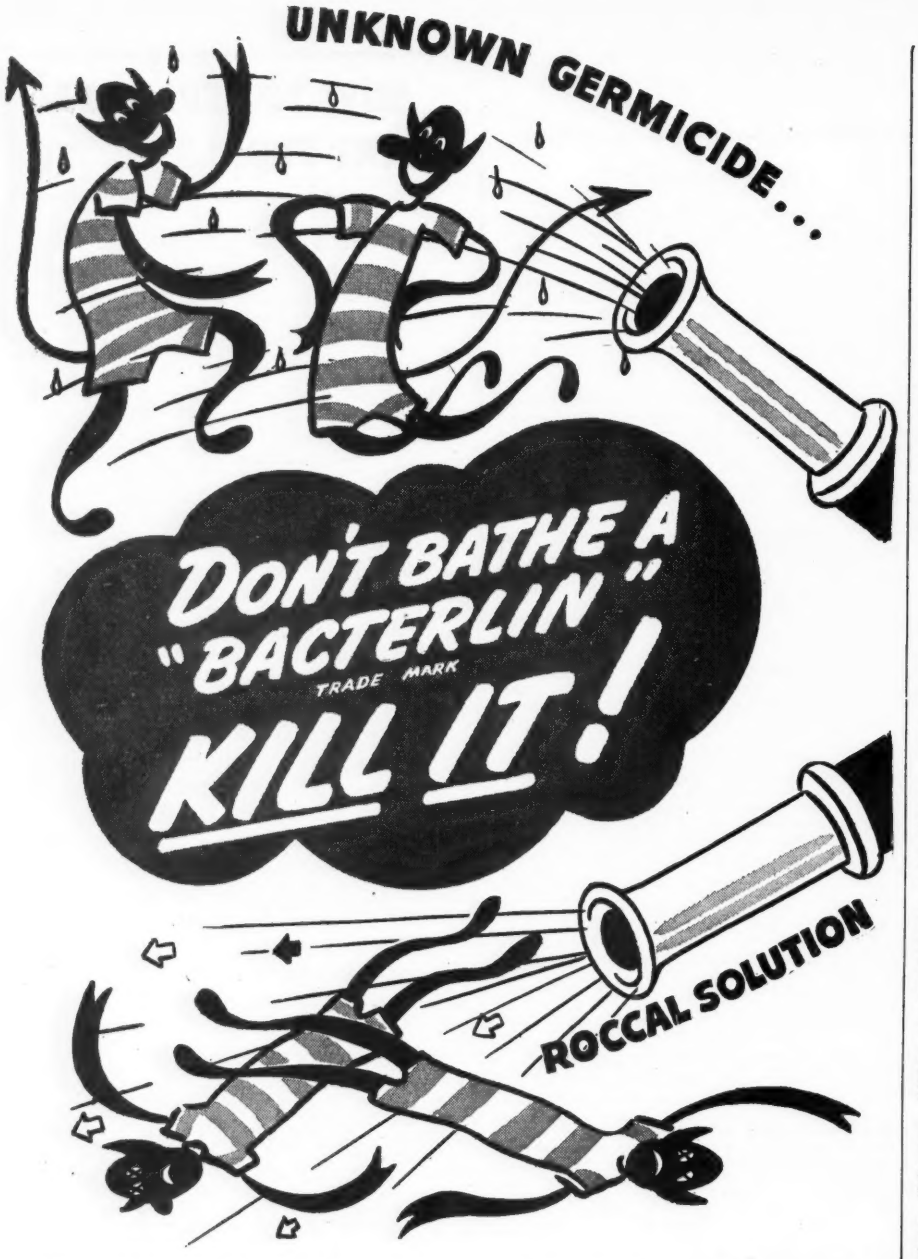

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Cheese Packaged in Envelope Type of Container Constructed To Fit in Box and Conform With Its Interior Without Seam or Fold and To Be Closed by Heat Sealing—James E. Snyder, Akron, Ohio, to Wingfoot Corp., Wilmington, Del. No. 2,383,352. Aug. 21, 1945.

Cheese Packaged in Folding-type Carton With Tuck-in Ends—Theodore C. Gevaart, Kiel, Wis. No. 2,382,308. Aug. 14, 1945.

Fluids Packaged in Flexible Collapsible Type of Container—Charles E. Gardner, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del. No. 2,382,987. Aug. 21, 1945.

Liquids Packaged in Container Having Semi-rigid Supporting Walls and Inner Lining of Substantially Leak-proof Bag of Puncture-resisting, Closely Woven Cloth Coated on Inside—Thomas Russell Baxter, Plainfield, N. J., to Standard Brands, Inc., New York, N. Y. No. 2,382,536. Aug. 14, 1945.

Sausage and Like Packaged in Reinforced Artificial Casings—Leo H. Goodman, one-half to Marcleph & Co., Inc., Brooklyn, N. Y. No. 2,384,426. Sept. 11, 1945.

STARCH

Food Containing Starch Granules, Protein and Normal Percent of Water Cooked Under Atmospheric Pressure to Give Minimum Hydrolysis of Starch, Vacuumized to Reduce Moisture Content to 33-45 Percent and Granulated to Particle Size Conducive to Uniform Subsequent Drying—Clarence H. Eshbaugh, Harold S. Mitchell and Levi Scott Paddock, to Industrial Patents Corp., Chicago, Ill. No. 2,385,068. Sept. 18, 1945.

Modified Whole Corn Protein Made From Corn Gluten Containing Starch And at Least About 50 Percent Proteinaceous Material—Richard Nicholas Monte, La Grange, and Jacob B. Gottfried, Chicago, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,384,388. Sept. 4, 1945.

Starch Converted to Sirup by Acid Hydrolysis Under Super-atmospheric Steam Pressure in Presence of Activated Carbon of Vegetable Origin—Richard Nicholas Monte, Cincinnati, Ohio, to Corn Products Refining Co., New York, N. Y. No. 2,383,914. Aug. 28, 1945.

Starch Modified by Action of Diastatic Enzyme Upon Raw Starch Milk at Temperature Below Gelatinization Point for Starch—Ralph W. Kerr, Riverside, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,380,848. July 31, 1945.

Starch Recovered From Roots by Forming Thin Slurry, Concentrating by Centrifugal Action, Filtering and Drying—Richard H. Schilling and George J. Mitchell, Minneapolis, Minn., to General Mills, Inc. No. 2,380,874. July 31, 1945.

Starch Treated to Make Tough Gel Precipitable by Aluminum Sulphate—George B. Fowler and Donald K. Pattilloch, Springfield, Mass.; Pattiloch, to Chemical Development, Inc., Chicago, Ill. No. 2,385,438. Sept. 25, 1945.

SWEETENERS

Sucrose Extracted From Impure Solution of Any Concentration And Substantially Free From Invert Sugar—Alfred M. Thomsen, San Francisco, Calif. No. 2,380,087. July 10, 1945.

Sugar Melts Treated With Calcium Hypochlorite in Presence of Chlorite and Phosphate Defecating Agent Preparatory to Decoloring With Activated Carbon—George P. Vincent, Poughkeepsie, N. Y., to Mathieson Alkali Works, Inc., New York, N. Y. No. 2,381,090. Aug. 7, 1945.

Sweetening Agent Made in Clear Solution Form From Fruit Liquid and Pulp—Arvid M. Erickson, San Jose, and John D. Ryan, Campbell, Calif., to Barron-Gray Packing Co., San Jose, Calif. No. 2,385,801. Oct. 2, 1945.

MISCELLANEOUS

Irish Moss Refined by Dissolving Gum Content in Sodium Chloride Solution and Precipitating With Alcohol—Norman Blihovde, Ridgewood, N. J., to Jacques Wolf & Co., Passaic, N. J. No. 2,382,286. Aug. 14, 1945.

Lactic Acid and Salts Made From Monosaccharides and Oligosaccharides—Ritchie Hart Lock, Chigwell, England. No. 2,382,889. Aug. 14, 1945.

Nordihydroguiaiaretic Acid Having Anti-rancidity Properties, Extracted From Larrea divaricata and Recovered by Formation of Flocculent Precipitate—Ole Gisvold, to Regents of

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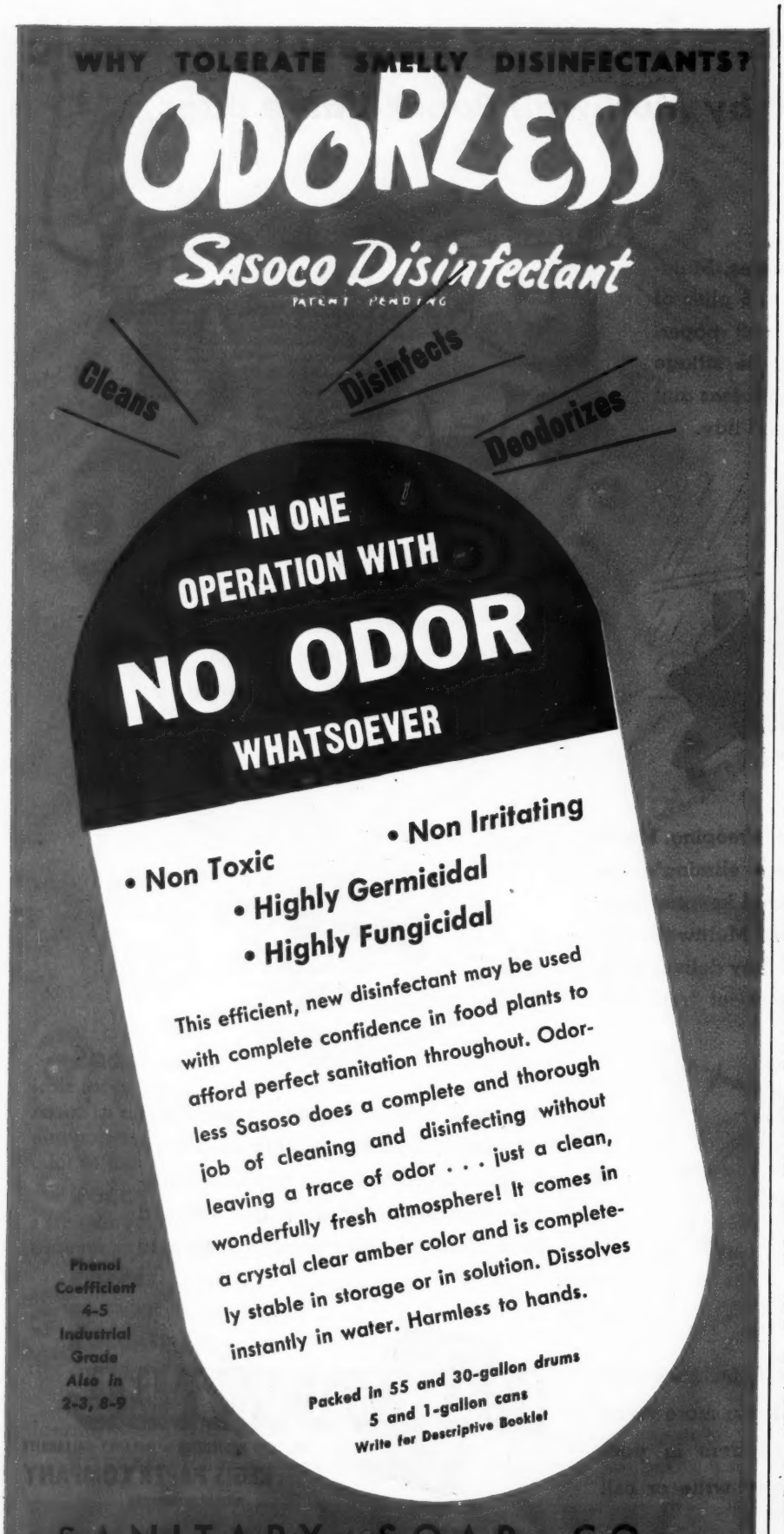
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the University of Minnesota, Minneapolis, Minn. No. 2,382,475. Aug. 14, 1945.

Seasonings Containing Capsium Oleoresin in Presence of NaCl or Acid-Hydrolysis Dextrose Stabilized To Prevent Loss of Capsicum Color and Strength and To Avoid Caking — Lloyd A. Hall, to The Griffith Laboratories, Chicago, Ill. No. 2,385,412. Sept. 25, 1945.

Soya Protein Treated with Water-Soluble Salt in Aqueous Ammonia or Aqueous Primary Aliphatic Amine to Make Water-resistant Coating Material, Stable to Putrefaction and Viscosity Changes — Harris O. Ware, Kalamazoo, Mich., to Hercules Powder Co., Wilmington, Del. No. 2,385,240. Sept. 18, 1945.

CANADIAN PATENTS

Filled Beverage Bottles Fitted With Sanitary Overcap — Wendel M. Schneider, Chicago, Ill. No. 428,931. July 24, 1945.

Temperature of Solid Mass of Butter Raised Uniformly by Inserting Plurality of Heat-conducting Pins Into Butter Mass — John F. Dixson, Toronto, Ontario, Canada. No. 429,080. July 31, 1945.

Water-soluble Corn Protein Mixed With Materials Containing Essential Amino Acids To Make Dairy Ration For Cows and Laying Ration For Hens—Richard J. Block, Scarsdale, New York, and Diana Bolling, Greenwich, Conn., to American Maize-Products Co., New York, N. Y. No. 429,111. July 31, 1945.

Dehydration Carried Out in Expeller Type of Equipment Operating With Partial Vacuum in Dehydrating Chamber — Bertram Fair Lundy, Vancouver, British Columbia, Canada. No. 429,225. Aug. 7, 1945.

Cereals Such as Yellow Corn Grits and Oat Groats Heat Treated in Presence of Moisture and Tempered Preparatory To Puffing—Helen L. Kellogg and John L. Kellogg, Chicago, Ill., to Kellogg Co., Battle Creek, Mich. No. 429,306. Aug. 7, 1945.

Fresh Meats Preserved by Coating With High-test Gelatine to Give Thin, Tough Outer Layer — William Wallace Bowers, to Wilson & Co., Inc., Chicago, Ill. No. 429,341. Aug. 7, 1945.

Dried Hams Prepared by Curing Fresh Ham, Removing Bones, Filling Voids With Gelatine or Fat or by Subjecting to Pressure, and Reducing Moisture Content to Less Than 50 Percent. — Elmer C. Oswald and Reese Gardiner Lewis, to Armour and Co., Chicago, Ill. No. 429,525. Aug. 24, 1945.

Fig and Other Dried Fruit Paste for Baked Dough Fillers Stabilized Against Agglomeration by Fine Grinding With Partially Fat-free Dried Coconut —Jesse Clayton Forkner and John Hood Forkner, Fresno, Calif. Nos. 429,883 and 429,884. Sept. 11, 1945.

Chocolate Made Resistant to Softening and Blooming in Hot-weather by Use of Chocolate Liquor Containing Cocoa Butter Pressed for Removal of Low and High Melting Fractions —Fred S. Carver, New York, N. Y. No. 430,078. Sept. 18, 1945.

Flour Bleached and Aged by Treatment with Powdered Mixture of Benzoyl Peroxide and Potassium Laurate— Frederic H. Penn, Dallas, Tex., to Novadel-Agent Corp., Belleville, N. J. No. 430,175. Sept. 18, 1945.

Cheese Made to Contain 0.05 to 0.50 Percent Psyllium Seed Husk—Anthony R. Sanna, Madison, Wis. No. 430,220. Sept. 25, 1945.

Rope and Mold Growths in Beverages, Breads and Other Foods Inhibited by Sodium Diacetate — Hans Ferdinand Bauer and Elmer Frederick Glabe, to Stein, Hall Manufacturing Co., Chicago, Ill., to Stein, Hall & Co., Inc., New York, N. Y. No. 430,302. Sept. 25, 1945.

Starch Added to Paper Pulp to Impart Grease-resistant Property—Herbert F. Gardner, Riverside; Clifford R. Swett, Algonquin; Jerome P. Strasser, Hampshire; and Lester W. Michels, Chicago, Ill., to Stein, Hall Manufacturing Co., to Stein, Hall & Co., Inc., New York, N. Y. No. 430,303. Sept. 25, 1945.

Beverages, Fruits and Vegetable Products Stabilized Against Fermentation and Flavor Deterioration by Treatment With Small Quantities of Monohalogen Acetic Acid Esters of Hydroxy Acids—Martin V. H. Prinz, Montreal, Canada. No. 430,362. Oct. 2, 1945.

Letters to the Editor

Scientists Need More Business Sense

To the Editor of
FOOD INDUSTRIES:

I ENJOYED the article, "Salaries for Food Technologists," and I consider it a fair statement of the case.

My reason for leaving our research department in favor of our operating field was exactly the same as Mr. Nelson's, quoted in the opening paragraph of the article. Frankly, I have made considerably more money by transferring my activities. At the same time, chemistry is still my "first love," and I have never been so happy as in my laboratory research days.

This article suggests activity on the part of such groups as the I.F.T. or the A.C.S., and so long as such activities are confined to publicizing the situation I think that might be helpful. However, the scientist is by nature a poor trader, engrossed in his own work, and too often willing to go along on a pitifully insufficient salary because of his interest in and love for his work. Frankly, I think advantage has been taken of this situation in the form of the salary scale for research men in many organizations, if not all organizations, with possible exceptions for outstanding individuals. I am pleased to be able to say that my company is considerably above average in this respect.

A Union?—Not That!

The situation is exactly what has spured unionism among other groups of workers in other fields, and possibly a good stiff dose of collective bargaining would be the best curative medicine. However, I abhor the thought that it should be necessary for intelligent, scientific men, dealing with presumably equally intelligent business executives, to resort to such practices. Moreover, the scientific man is by training and nature an individualist, and I gravely question if any organization of scientific men for collective bargaining purposes could endure or be successful. I, personally, would leave the scientific field before I would concede my individual right to make my own deal for my own job.

I conclude that publicity such as your article contemplates, repeated ad infinitum, is the best available weapon. We are confronted at present with a demand for competent scientific personnel in excess of the supply. If you and others can succeed in impressing this thought on both employing executives and scientific personnel, you may succeed in stimulating the former to more liberality and the latter to a little more business-like demand for proper financial recognition of their ability and services. What the situation needs most, I believe, is a persistent effort to arouse technical personnel to the realization that they are not, as a class, being adequately compensated for their services, and that the present situation offers an exceptional opportunity to do something about it. It is high time that the scientist acquired at least a proportion of business viewpoint and ceased to be like Pope's "starving chemist in his golden views supremely blessed."—*General Superintendent, Company B.*

The Fault, Dear Brutus, Is in Ourselves

To the Editor of
FOOD INDUSTRIES:

MY compliments to the author of the article, "Salaries for Food Technologists," in the October issue of FOOD INDUSTRIES.

It is high time that the status of the chemist in industry, and particularly in non-chemical industry, be brought into the open for discussion. Now that the ice has been broken, it will be interesting to see how many red-blooded chemists will speak up on this subject.

I make no habit of expressing my opinions to editors on every controversial matter about which I read. Here is one, however, which strikes close to home and spurs me to action.

By way of qualification, I have been a chemical engineer for 23 years and a food technologist for more than 20. In our industry chemists are part of the service organization and usually do not appear on the administrative staff. Although we have maintained a fair degree of chemical control for about 32 years, the chemists still are not considered to be a really vital link in the organization setup.

One reason for this is that many food companies such as ours made money when a chemist was still a curiosity. To this day, many, if not most executives in our field do not know how to use us to the best advantage. They have a low opinion of our group as possible executive ma-

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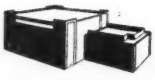

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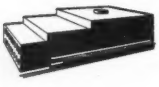

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terial and all too frequently consider a chemist as something of a crank.

After years of observation, I say that the chemists themselves are responsible for their sorry plight. The punch line in your article is the quotation from Shakespeare: "The fault, dear Brutus, is not in our stars, but in ourselves, that we are underlings."

One of our chief troubles is that the title "chemist" has been appropriated by thousands of people, from druggists to all kinds of laboratory assistants, almost down to bottle washers, who have no professional right to its use. These people are getting away with their self-rating to the detriment of the rest of us who are trying to lift ourselves by our boot straps to the financial and social level we think we deserve.

In the last Alumni News from my own college—no cow college either—there was a feature article entitled "Alumnae Employed as Chemists with ——— Steel Co." The Editor's Note stated that two sisters, the heroines of the story, former students in education and medical technology, respectively, had obtained employment in a chemical laboratory. Presto! The Editor made them chemists. The girls deserve all credit due them as laboratory analysts, but they are not chemists in my league.

The point is that if that editor, a college graduate, living in a college town and Alumni Secretary to boot, toys with out professional standards, then what degree of respect can we command from the hard-boiled business world.

As a group, we are looked upon as being more or less tiresome company, humorless and uninteresting. We are not leaders in civic affairs nor are we social lions. To the live-wire business man, we are rated well down the scale in appearance and manner of approach, lacking in personality and downright dull on any subject other than chemistry. We do not know how to handle ourselves well in public, nor sell anything, including our own talents. Not being qualified to maneuver ourselves into effective position, we need management; therefore, we cannot be good managers with responsibilities commanding salaries in the higher brackets.

I regret to admit that I agree with much of this criticism. Something should be done about it. Our largest and strongest organization, the American Chemical Society, has accomplished much, but their progress has been mostly in a lateral direction.

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This corn sugar crystallizer has a new lease on life.

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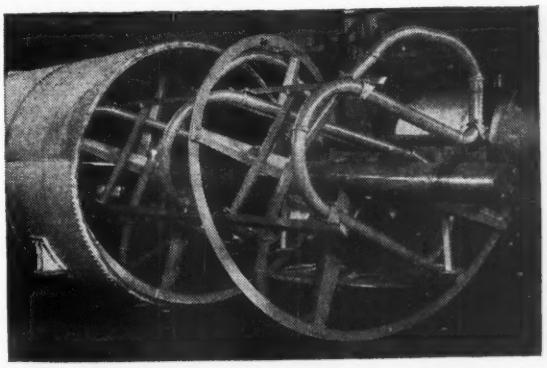
NOW READY *for installation of agitator, heater and lined head. This steel crystallizer, 20 feet in length and 10 feet in diameter, has been completely lined with 16 gauge nickel sheet by* Leader Iron Works, Inc., *Decatur, Ill.*



SPECIALLY DESIGNED *heating coil and agitator for the corn sugar crystallizer pictured above. Coil and ribbon are Monel; arms and braces are 20% nickel-clad steel. Sheathing on the shaft is nickel.*

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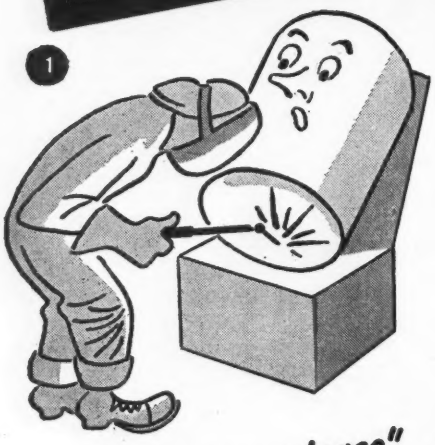
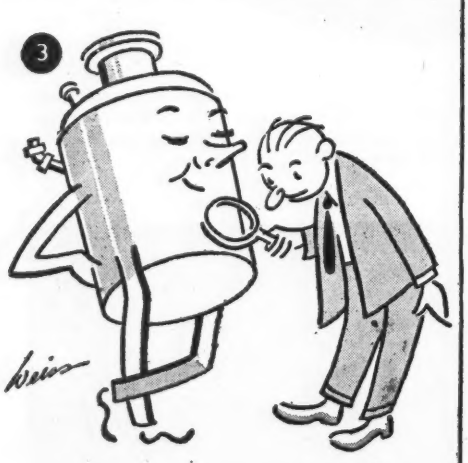


"Not too hot, please"

"Shine 'em up"



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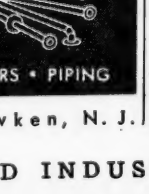

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Educational institutions have been rated as accredited or not accredited to graduate young men and women as chemists. This should be tied down tight by registering chemists free of charge and certifying them as deserving of the title.

A comimttee of topnotch men should be appointed to plan a direct approach to the industrial management group. These are the men upon whom our futures depend. They have the power to advance us or exploit us. What is more, they hold the strings to the money bags. Why not concentrate on selling ourselves to the boss and let the public hear about us later?

We need to keep men like Donald Nelson in our profession. Basically, there is no good reason why we cannot do so. Let's get together, those of us who by choice or circumstances are still holding on, and carve our rightful niche in the postwar world.
—*Chief Chemist, Company C.*

Publication of "Salaries for Food Technologists" in October has inspired considerable discussion of the author's contentions. We have received several letters, from technologists and from men in management. Two appear here, others will be published later.—THE EDITORS

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

DEHYDRATION

Dry Milk Blocks

SOLUBLE MILK blocks for the preparation of desserts and beverages have been prepared in England from whole dried milk, sugar, cocoa or other flavoring and extra fat to raise the fat content to 20 percent. The fat is added molten and the mixture is molded, or rolled into slabs and cut. The fat forms a continuous phase, binding the block. This method, which follows that used for chocolate bars, was developed to take advantage of the shipping convenience of compressed blocks rather than powder, while at the same time avoiding the use of large and expensive compression machinery.

A disadvantage is that while the blocks made in this way do not need to be ground or crumbled for reconstitution, they do require boiling water. And the high fat forms a slight scum as a beverage cools.

Refined deodorized cocoa butter is preferred for use in cool climates. Refined hydrogenated palm kernel oils can be utilized to increase the melting point for warm climates.

Digest from "Quick Soluble Milk Blocks," by O. de Rousset-Hall and M. Ingram, *Food Manufacture*, vol. 20, 331-3, September, 1945.

FATS AND OILS

Vitamin Oils

OIL that is clear, attractive and unobjectionable in taste, easily tolerated, and high in both vitamin A and D, is obtained from the New Zealand ling, *Genypterus blacodes*. The minced fresh livers are steamed for about ½ hour, then centrifuged at 170 to 180 deg. F. A 25 to 40 percent yield is obtained. Vitamin A content has been found to vary from 8,000 to 15,000 I.U. per gram, with vitamin D about 500 I.U.

Minced groper livers (*Polyprion oxygeneios*) are digested with commercial pepsin after being brought to a pH between 1.5 and 2 with HCl. No other method of freeing the oil gives a satisfactory product.

After digestion at 110 to 120 deg. F. for 48 hours, the batch is neutralized with sodium carbonate, then the slurry is centrifuged at 170 deg. F. Oil yields are 8 to 20 percent on the weight of the original livers.

From fresh livers the oil is golden-yellow in color, with bland taste and free from objectionable smell. There is about 2 percent free fatty acids. From livers that are not fresh the oil is darker and has a higher free fatty acid content. It can be decolorized and deodorized by alkali refining.

Vitamin A content of factory-produced groper liver oil has averaged 60,000 I.U. per gram, with a maximum of 88,600 and a minimum (from stale livers) of 35,000 I.U. per gram. Vitamin D range is 2,400 to 4,000 I.U. per gram.

Shark liver oil of the usual properties is also produced.

Digest from "Large-scale Production of Liver Oils from Some New Zealand Fish," by M. M. Cunningham and C. Scott, *New Zealand Journal of Science and Technology*, vol. 26, sec. B, 21-27, July, 1944.

CANNING

Processing Times

CURING AGENTS in the concentrations permissible in meat for canning do not reduce the time or the temperature required for processing the cured meats.

In preparing the samples, ground fresh meat was treated with the curing agent and inoculum. Tubes were incubated 24 hours at 38 deg. F., then processed at 240 deg. F. for various times up to 1 hour. To test the effect of the processing, specimens were cultured into brain medium and incubated at 82.4 deg. F. for 11 days. If no growth was evident by that time, a further incubation period of 4 days at 98.6 deg. F. followed. Duplicate processed tubes were held at 82.4 deg. F. for periods up to 1 year and examined periodically to determine the time of onset of spoilage.

The test organism was designated as anaerobe S_2. It closely resembled *Clostridium botulinum* and *Clostridium sporogenes*. Curing agents, used alone or in combination were, per 100 lb. of meat: sugar, 1 lb.; sodium chloride, 1½ lb. and 3½ lb.; sodium nitrate, 2¾ oz.; and sodium nitrite, ¼ oz.

On the long holding tests, sodium chloride in a concentration of 3½ lb. did inhibit spoilage for a least a year, in most samples. The nitrate and nitrite alone were ineffective and added nothing to the protective action of the salt. Sugar was also of no help.

Digest from "Bacteriological Studies Relating to Thermal Processing of Canned Meats. II. Influence of Meat-Curing Agents Upon Thermal Resistance of Spores of a Putrefactive Anaerobic Bacterium in Meat," and "III. Influence of Meat-Curing Agents Upon Growth of a Putrefactive Anaerobic Bacterium in Heat-Processed Meat," by C. R. Stumbo, C. E. Gross and C. Vinton, *Food Research*, vol. 10, 283-92 and 293-302, July-August, 1945.

FERMENTATION

Sugar Tolerance

STRAINS of *Saccharomyces cerevisiae* Hansen differ in ability to tolerate high sugar concentrations. Inhibition of alcoholic fermentation in sugar solutions is not due to the concentration of alcohol present. It may be accounted for by osmotic phenomena, since the initial concentration of glucose causing loss in fermentation efficiency corresponds reasonably well to the concentration exhibiting the beginning of plasmolysis. There may, however, be other factors involved, since variations in the optimum concentration for maximum respiration for different strains have been reported for sugar solutions well below the concentration required to produce plasmolysis.

For four strains investigated, a marked decrease in the percentage of glucose utilized occurred in the least resistant at approximately 11 g. per milliliter of glucose, and for the most resistant between 16 and 17 percent, as judged from curves presented. For the least resistant, the figures were 99.4 percent utilization at 9.544 g. per 100 ml. of initial glucose and 96.10 percent at 13.608 g., with a rapid decrease above that. For the most resistant, the corresponding data are 99.40 percent utilization at an initial concentration of 13.224 g. per 100 ml; 98.45 percent at 18.320 g., and 79.55 percent at 22.368 g.

While approximate sugar tolerance can be determined by the use of glucose solutions under the microscope, the difficulty of observing

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the onset of plasmolysis makes fermentation studies advisable for accurate evaluation of the sugar tolerance of yeast strains

Digest from "The Sugar Tolerance of Four Strains of Distillers' Yeast" by W. D. Gray, *Journal of Bacteriology*, vol. 49, 445-52, May, 1945.

Spice vs. Yeasts

CINNAMON and cloves inhibit growth of several yeasts under test conditions and other spices show some effect in specific cases. However, experimental results with several of the more widely used spices do not support the belief that these materials, as a group, have preservative properties.

In water infusions at 1:100 concentration, cinnamon did not stop the growth of *Torula sphaerica*, although it did at 1:50. It was not effective against *Saccharomyces cerevisae* at 1:50.

Clove infusions at 1:100 were effective against *Zygosaccharomyces priorianus*, *Mycoderma vinii* and *Schizomycetes mellacei*, and at 1:50 against *Saccharomyces cerevisiae*. Mustard and red pepper were in general effective in retarding but not preventing growth at 1:50 dilution. Bay leaves, black pepper, nutmeg and paprika were not effective.

Test organisms other than those mentioned were *Oidium lactis*, *Saccharomyces hansenii* and *Zygosaccharomyces pastori*.

Spice oils, probably owing to the greater concentrations, came nearer to demonstrating preservative action, but with both the water infusions and the oils there was evidence of adaptation to the spice environment.

Frost double plates and the Himebaugh cup plate methods were used with a sugar-agar medium.

Digest from "Effect of Spices and Flavoring Materials on Growth of Yeasts," by A. H. Webb and F. W. Tanner, *Food Research*, vol. 10, 273-82, July-August, 1945.

PACKAGING

Propionate for Molds

UNDER storage conditions conducive to extremely rapid mold growth, wrapping in parchment paper that had been treated with a calcium propionate solution prevented development of mold spores sprayed on the surface of 93-score unsalted butter prints. The most effective treating solution was 5 percent calcium propionate brought to pH 5.5 with lactic acid.

Suitable impregnated parchment paper can be prepared by dipping in the solution of inhibitor and dry-

Vilter Ammonia Compressors in a large mid-Western plant. *At left:* Three 10½ x 10½" vertical compressors with synchronous motor drive. *At right:* Three 4½ x 4½" vertical compressors.

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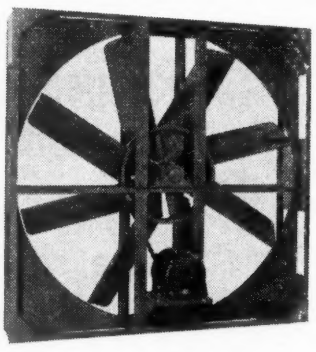

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ing. The paper must be used dry, soaking, even briefly, in water moves the reagent to such an extent as to make the wrapper ineffective.

In flavor tests after storage under adverse conditions, papers treated with sodium propionate produced an objectionable flavor similar to that of neutralized sweet cream, while calcium propionate in strengths of 10 percent or more produced a bitter taste, also described as objectionable. The acidified 5 percent propionate gave a slightly bitter flavor which did not at any time become objectionable, while it prevented development of an aged taste until after the control had been reported definitely aged and moldy. The control had been wrapped in sterile parchment paper.

Addition of sodium chloride to the propionates did not improve the mold resistance, although it was found easier to prevent mold development in salted than in unsalted butter.

Digest from "Propionic Acid, Sodium Propionate and Calcium Propionate as Inhibitors of Mold Growth. I. Observations on the Use of Propionate-Treated Parchment in Inhibiting Mold Growth on the Surface of Butter," by J. C. Olson, Jr., and H. Macy, *Journal of Dairy Science*, vol. 28, 701-10, September, 1945.

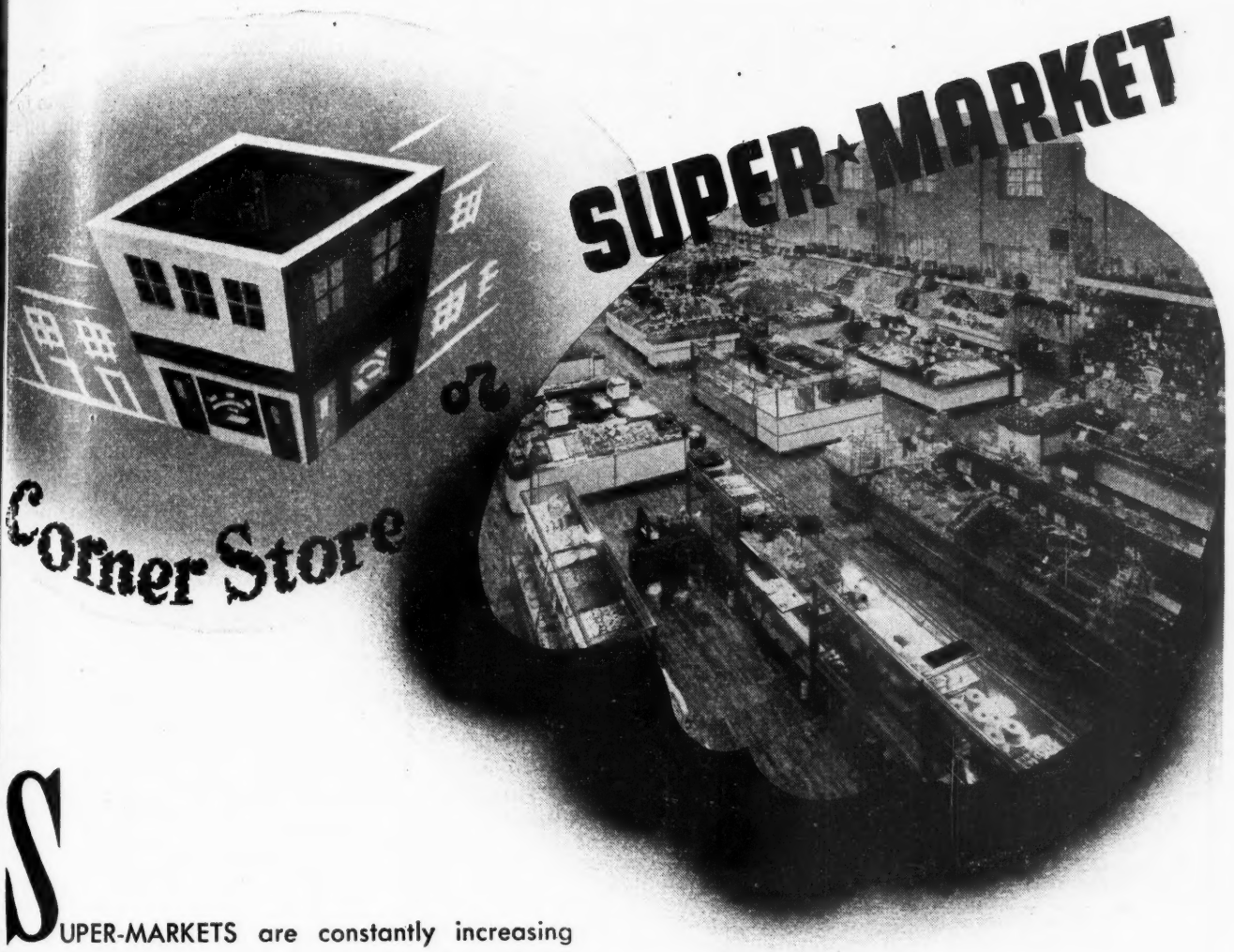
Oxygen in Milk

OXYGEN that is liberated into the headspace of vacuum-packed whole milk powder during the first week after packing has not been held by the powder by adsorption. Grinding of the powder, which increases the surface area, results in a decrease of the oxygen liberated.

Retention of the air in the particles during evacuation of the can is due to impermeability of the cell wall. Oxygen liberated after sealing varies roughly in proportion to the cell volume of the powder per unit of weight. The presence of cell clusters increases the amount of entrapped air and this can be eliminated by removing foam from the milk before spraying, but deaeration of the concentrated milk does not result in any further decrease in oxygen, so that it is not entirely a question of the presence of air in the liquid. Other experiments demonstrate that solution of the gases in the contained fat is not a factor.

Experiments with whole egg to which lactose sirup was added before spraying confirm the theory that there is a continuous lactose "glass" in the milk particles which prevents the removal of the air during evacuation of the can.

Removal of the contained air, then, is dependent on the slow diffusion of air from the center of the



SUPER-MARKETS are constantly increasing in popularity because the housewife finds everything she needs under one roof. It's a one-stop job that always saves time, and often saves money.

Like a balanced meal, packaging also requires careful shopping for many different materials. Each individual product must have exactly the right combination of appearance, protection, production efficiency and economy.

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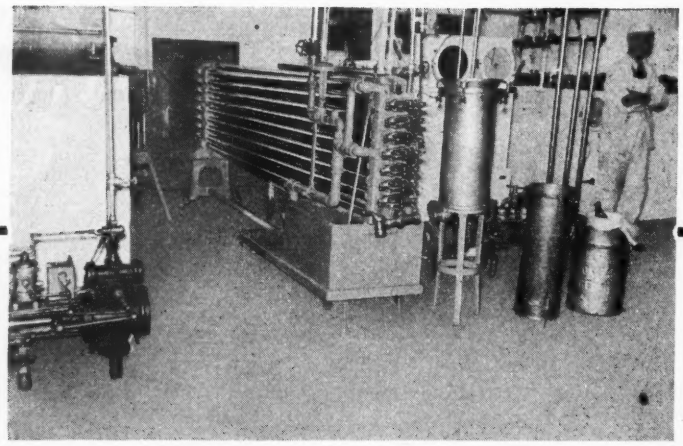

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particle and the author demonstrates mathematically that if the particles are held under vacuum for a period sufficient to permit diffusion, the oxygen removal in the can is effective. Alternatively, if the particles in an evacuated and gas-filled can are subjected to a second evacuation after sufficient time has elapsed for diffusion to take place, the desired lowering of the residual oxygen is achieved. The former method is recommended, 20 hours under vacuum before packing being sufficient. But reevacuation of the can and filling again with nitrogen or carbon dioxide, after a 24-hour interval, will give good results.

Digest from "Packing Dry Whole Milk in Inert Gas," by S. T. Coulter and R. Jenness, *University of Minnesota Agricultural Experiment Station Technical Bulletin* No. 167, June, 1945.

MATERIALS

Agar Independence

NEW ZEALAND has seaweeds, *Pterocladia lucida* and *P. capillacea*, which are closely related to the gelidia used by the Japanese in agar manufacture.

Experiments with the two types mentioned were sufficiently promising so that commercial development has been undertaken. The availability of native Maori labor has made collection of the seaweeds feasible.

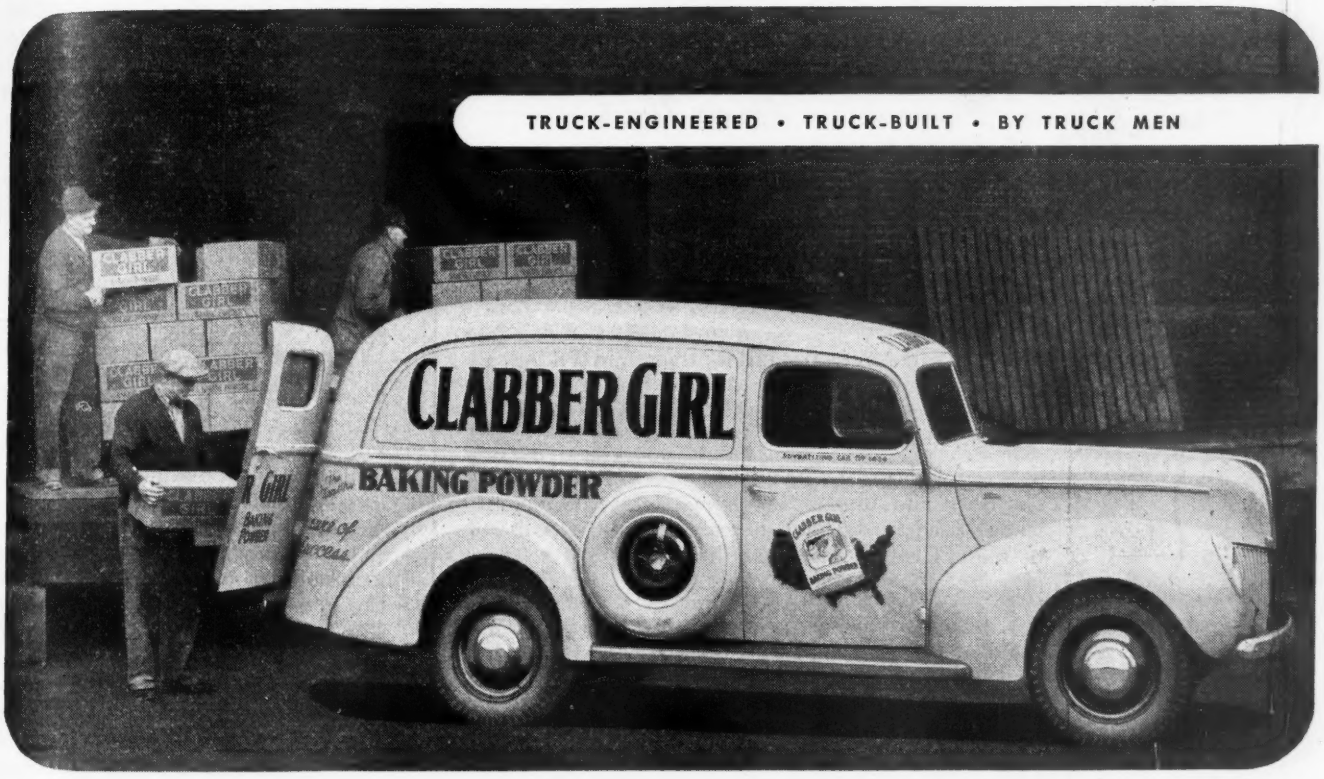
One factory is processing the weed. The product is described as a clear, bright, colorless, agar differing slightly from the Japanese product. Melting point is between 187.7 and 192 deg. F. Setting point varies from 95 to 102 deg. F. The gel is strong but inclined to be brittle. There is no loss of strength after autoclaving at 20 lb. pressure for 20 minutes on three successive days.

For a gel of strength equivalent to 1 percent of Japanese agar, only 0.6 to 0.7 percent solution is required.

The product has been well accepted by meat packers, as well as manufacturers of condensed milk, cosmetics and pharmaceuticals.

Details of the operation are not given, but a general outline of the process indicates that sun-dried weed is washed with cold water in wooden vats to remove salt, sand and foreign matter which includes corallines and sponges. Hydrolysis is carried out under pressure, extraction being in several waters. (The report does not give the factory operating conditions, but experimental extraction at 10 lb. pressure for three hours is mentioned.) The extracted liquors are mixed,

Better Trucks for YOUR Business!



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The past four years have turned the spotlight on Ford universal service as never before. Trucks have *had* to stay on the job . . . and that has called for real *service*, close at hand. Mr. Ralph Horton, of Hulman and Company, Terre Haute, Indiana, manufacturers of famous "Clabber Girl" Baking Powder, sums it up:

"Our firm has used Ford trucks and cars for years, with satisfactory results. We have particularly appreciated the availability of Ford service during these years when every piece of transportation has been doubly important."

New Ford Trucks are being built, and are available in the more popular models. They're the best in Ford history—better performing, more enduring, more economical. Order your new ones now, for earliest delivery.

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A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Tough, forged front axles • Extra-sturdy rear axles with pinion straddle-mounted on 3 large roller bearings, 3/4-floating type in light duty units, full-floating in all others • 3 axle ratios available (2 in 1-ton unit) • 2-speed axle available in heavy duty units at extra cost • Powerful hydraulic brakes, large drums, cast braking surfaces • Rugged 4-speed transmission with NEW internal reverse lock optional at extra cost on light duty units, standard on all others.

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MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

More and More FASTER and FASTER!

fig. 62

Come Your

VIKING PUMPS

The Viking factory, which has been devoted 90% to producing pumps for the armed forces, is being reconverted to civilian production just as rapidly as possible.

You should note a gradual but substantial increase in Viking pumps available for your industry by November 1st. This picture should be considerably brighter by January 1st, 1946.

Write today for Bulletin Series 100E which describes and illustrates Viking Rotary Pumps widely used in the food processing field. It will be sent FREE by return mail.

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AN IMPORTANT MESSAGE TO PLANT MANAGEMENT
Regarding Control of
SKIN IRRITATIONS

TARBONIS is effective in both preventing and clearing up skin irritations resulting from the handling of a wide variety of foodstuffs —too long immersion of hands in brine—constant contact with acid-type foods, etc.

Not merely a protective, TARBONIS is also effective in clearing up a high percentage of stubborn skin conditions encountered in industry. Easy to apply—nothing to remove. Pleasant, odorless, greaseless, stainless.

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bleached and filtered, then allowed to cool in pans. The gel is dialyzed "in a series of operations," the non-gelling compounds being removed by freezing. The gel is then thawed and dried. Dry agar is ground to a powder in a hammer mill.

It is estimated that this operation, carried on by a plant mainly devoted to gelatine and glue, will result in a production equal to the entire needs of New Zealand for bacteriological and ingredient agar.

Digest from "New Zealand Seaweed for Agar-Manufacture," by L. B. Moore, *New Zealand Journal of Science and Technology*, vol. 25, Sec. B, 183-209, 1944.

BAKING

With Dried Eggs

FOAM VOLUME is a convenient indication of baking quality for dried whole eggs. It correlates reasonably well with loaf volume, is subject to less variation in determination and is a quicker test than loaf volume.

Distilled water, 56 ml., is added gradually to a mixture of 19 g. of the dried egg powder and 60 g. of sugar. The mixture is heated to 104 deg. F. in a water bath, mixed 10 minutes in a cabinet at 104 deg. F. and 80 percent relative humidity. The foam is transferred to a graduate for measurement. A "Mixmaster" at No. 10 speed is used for the beating.

Following this procedure, reproducible results are obtained.

Digest from "Dried Whole Egg Powder. XVII. Objective Tests and Baking Quality," by M. Reid and J. A. Pearce, *Canadian Journal of Research*, vol. 23F, 239-42, July, 1945.

SUGARS

Galactose

HYDROLYZATION of lactose may be used to increase the total solids in sugar sirups. Mixtures of glucose and gelactose at 77 deg. F. show a higher total sugar solubility than that for the individual sugars alone. The most concentrated equilibrium solution contains almost 50 percent of glucose and 8.5 percent galactose at that temperature, and a mixture of equal parts of the two sugars will give 42 percent total sugar. At the same temperature, glucose in water is saturated at 50.8 percent and galactose at 32.09 percent.

U.S.P. or high grade technical lactose, when hydrolyzed with hydrochloric acid, gave yields of 93 percent of the theoretical. Organic acids must be used in so great a concentration, if they are substituted for the hydrochloric, that a

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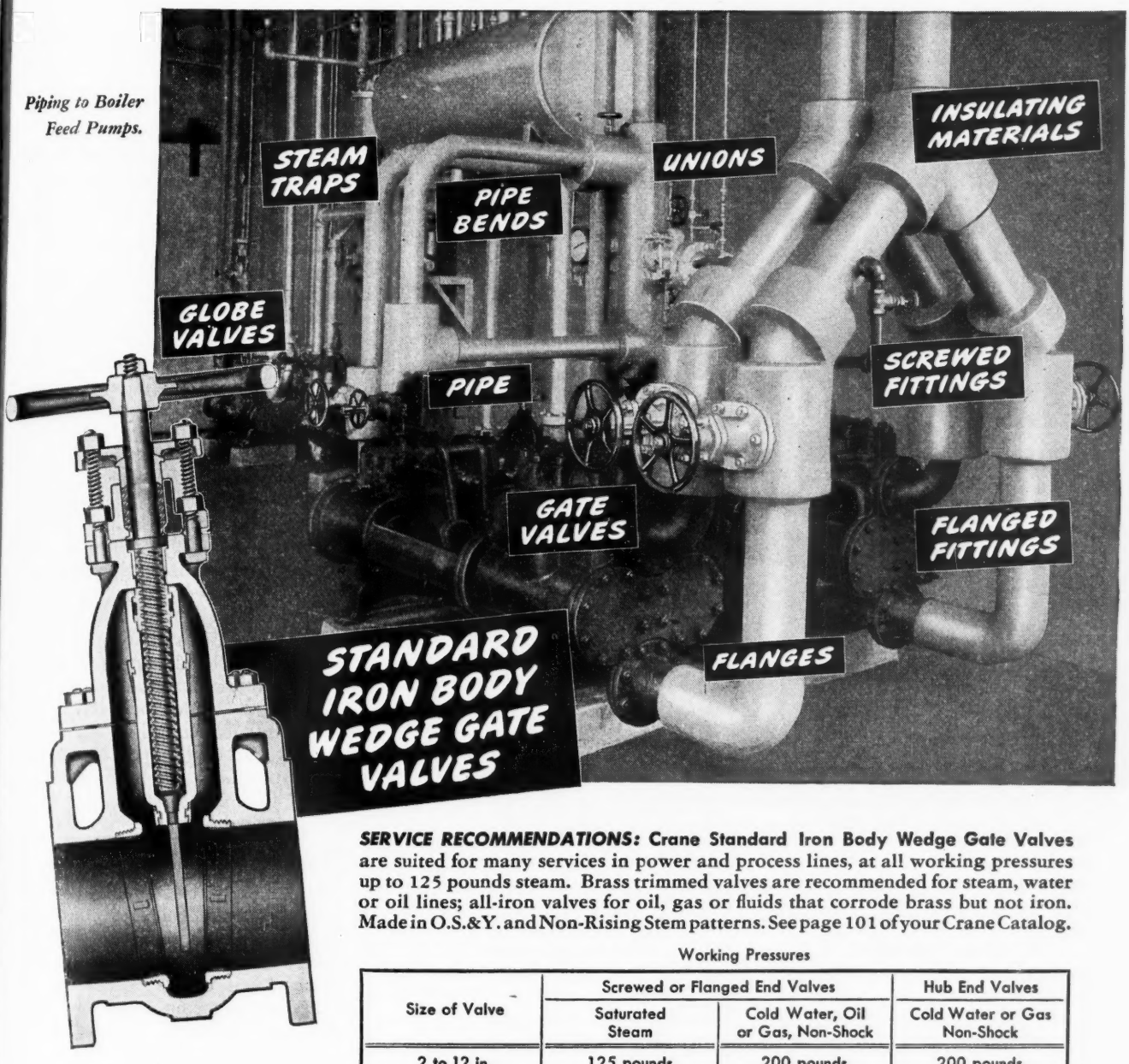

Piping to Boiler Feed Pumps.

SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** are suited for many services in power and process lines, at all working pressures up to 125 pounds steam. Brass trimmed valves are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-Rising Stem patterns. See page 101 of your Crane Catalog.

Working Pressures

Size of Valve	Screwed or Flanged End Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150-Pound Cast Steel Gate Valves are recommended. (For sizes under 2-in., use Crane Clamp Gate Valves.)

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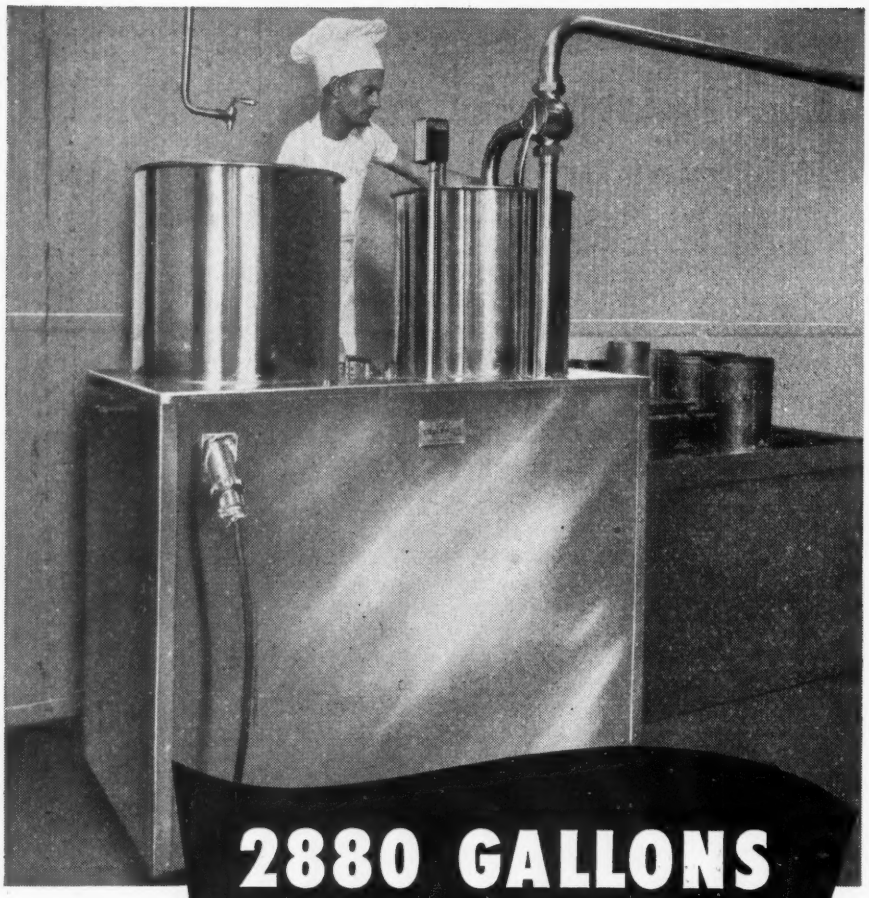

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The self-contained Case unit requires no pre-mixing nor beating mechanism. Liquid ingredients flow from individual supply compartments into the emulsifying devices, where perfect blending of all components takes place. The emulsion is then delivered directly to the filling equipment by a turn of a valve.

Sanitary stainless steel construction simplifies cleaning. The Case Emulsifier is moved easily from department to department for a variety of products.

Investigate today. The Case Emulsifier will save your investment many times in reduced overhead, labor and power costs.

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EMULSIFIER-HOMOGENIZER

A. T. CASE CO. ★ 6107 AVALON BLVD. ★ LOS ANGELES 3, CALIF.

very undesirable high salt content results when the solution is neutralized. Lactose in whey cannot be hydrolyzed directly for food use because of the excessive caramelization that takes place.

In connection with this work, one of the authors presented a method for determination of the three sugars, glucose, lactose and galactose, in the presence of one another.

Digest from "The Acid Hydrolysis of Lactose and the Preparation of Hydrolyzed Lactose Sirup," by G. A. Ramsdell and B. H. Webb, *Journal of Dairy Science*, vol. 28, 677-86; and "Determination of Glucose, Galactose and Lactose in Their Mixtures," by Ramsdell, 671-76, September, 1945.

Values in Wastes

FURFURAL, xylose, alcohol and lignin in commercially interesting quantities can be obtained from corn cobs and other agricultural wastes by a continuous process developed through the large-scale laboratory stage by the Northern Regional Research Laboratory.

Agricultural residues studied were corn cobs, sugar cane bagasse, flax shives, oat hulls and cottonseed hulls. All of these are available in worthwhile quantities within collecting range of possible plant locations. All have an advantage over wood as a starting material in that their less-dense structure permits a cleancut hydrolytic separation of pentosans and hexoses. Experimental work on corn cobs is reported.

Pentosans are removed from the crushed corn cobs by countercurrent hydrolysis with dilute sulphuric acid at a temperature just below the boiling point. Under properly controlled conditions a yield of from 90 to 95 percent of the pentosans, as reaction products, is obtained in 80 minutes to 2 hours. The pentosan solutions can be further treated to yield furfural, xylenose and solvent chemicals.

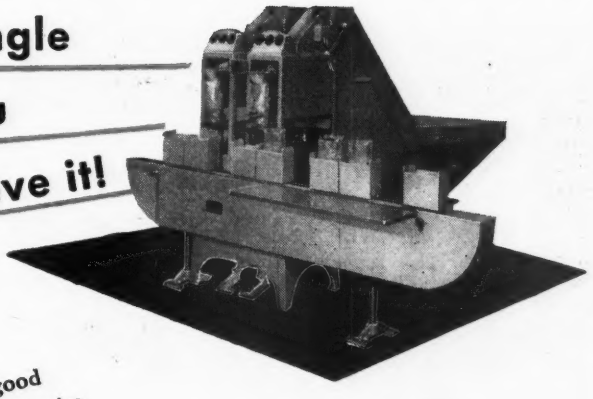
The residue left after filtration of the pentosan hydrolysate contains very little reducing sugar.

To break down the cellulose 85 percent sulphuric acid is required, so this residue must be dried. The sulphuric acid already present from the first hydrolysis is not removed, since this acid is concentrated as the residue is dried. Residues dried in the presence of the acid readily undergo saccharification.

The concentrated sulphuric acid is incorporated into the finely ground dry residue in a continuous machine designed on the principle of the oil expeller—an interrupted screw with the pitch of each worm flight calculated to obtain optimum compression.

a new high ...in packaging accuracy!

It's uncanny — this Triangle ELEC-TRI-PAK — you almost have to see it to believe it!



USERS of Triangle ELEC-TRI-PAKS are amazed at their extreme accuracy. One machine actually weighs and fills short pretzel sticks to accuracies within 2 or 3 sticks per 10 ounce package!

ELEC-TRI-PAKS are versatile too . . . they do as good a job on weighing rice as on sandwich cookies. They're fast, easy to operate, they save labor. So gently do they handle products that they're even used to package potato chips without breakage. And . . . they're available in a variety of models for packaging from 15 to 80 packages per minute, and more.

For a new high in packaging efficiency, reduced costs, time and labor savings, as well as almost unbelievable weighing accuracy . . . here is your answer . . . a Triangle ELEC-TRI-PAK. **Write for details . . . TODAY!**

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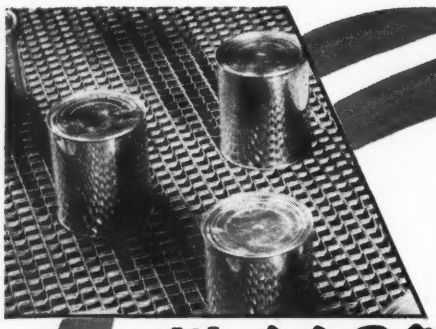

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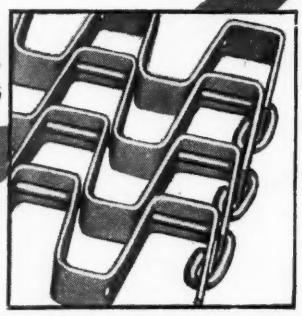
FLEXIBLE STEEL CONVEYOR BELTING



Engineered to today's processes, this modern steel belting can be used in all of the newest methods of canning, dehydrating and freezing. Steam, acids and extreme temperatures do not harm it. Steel mesh feature allows circulation of air and liquids around products in process; also facilitates cleaning and sterilizing with steam gun or hot water. La Porte belting will not stretch, weave, creep, nor jump. Its rugged construction assures long, economical service and low maintenance costs. No special dressing or belt lacers needed to keep it at peak efficiency.

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5 Will gain favor for your products with housewives alert to nutritional values.

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GENERAL BIOCHEMICALS, INC.

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GOLDEN YELLOW CAROTENE...The Vitamin A Nature Supplies in Fruits and Vegetables

The acid-cured residue absorbs and reacts with the concentrated sulphuric acid in less than 5 minutes. Hydrolysis of the degraded ligno-cellulose is then completed by diluting to 8 percent sulphuric acid. Only 7 to 10 minutes is required, at 248 to 266 deg. F. Hydrolyzates can be obtained that contain 10.5 percent dextrose.

Lignin is filtered out and the acid neutralized with lime. The resultant dextrose solutions are readily fermented by yeast to alcohol.

Cost calculations based on laboratory work and unit operations indicate sufficient possible return on the products to warrant semi-works trials, which are to be conducted and reported later.

Digest from "The Saccharification of Agricultural Residues," by J. W. Dunning and E. C. Lathrop, *Industrial and Engineering Chemistry*, vol. 37, 24-29, January, 1945.

MISCELLANEOUS

Safe Fish Handling

PREVENTION of dermatitis in fish handling requires first of all the use of rubber gloves heavy enough to prevent puncture of the worker's hand by bones and scaly portions of the fish. The gloves should have treads at the finger tips so that slippery fish can be handled. A light rubber glove worn under a cotton glove may be used if the type with the nonslipping tread is not available.

It is suggested that two pairs of gloves be issued for each shift, one pair to be worn for half the shift and then washed in water containing a small amount of chlorine. Gloves should be allowed to dry during the balance of the shift.

Dermatitis, because of its frequency among fishermen and fish handlers, is a serious occupational hazard. It may be due to abrasions, lacerations and fissures incurred in the handling of the fish or gear, to secondary infections, to bites and stings, or to specific irritating conditions such as the presence of "red-feed" in mackerel digestive juice or the irritant contained in the slimy skin of the skipjack. Prevention of direct contact with the fish and particularly the slurry, will reduce its incidence. Its treatment requires medical attention.

The above recommendations, important to food plant management, are incorporated in an article mainly devoted to the medical aspects of this problem.

Digest from "Dermatitis in the Fish Industry," by L. Schwartz and I. R. Tabershaw, *The Journal of Industrial Hygiene and Toxicology*, vol. 27, January, 1945.

FORMULAS FOR FOODS

FORMULA NO. 561

Colonial Cake with Soya

Water	4 lb.
Enzyme-converted corn sirup	3 lb.
Emulsifying shortening	2 lb. 1½ oz.
Granulated sugar	1 lb. 8 oz.
Brown sugar	2 lb. 8 oz.
Cake flour, high grade	5 lb.
Full-fat soya flour	1 lb.
Salt	3 oz.
Baking powder	6 oz.
Soda	¼ oz.
Whole eggs	2 lb. 8 oz.
Maple flavor	1 oz.
Caramel color	½ oz.

Directions

Weigh into the mixing bowl the enzyme-converted sirup and the shortening, with 3 lb. of water. Sift together the sugars, flours, salt and leavening, blending well. Mix into the sirup and shortening, continuing to mix for 5 minutes after smooth, using low speed. Mix the eggs with 1 lb. of water and the flavorings, adding in two or three equal parts. Mix smooth after each addition, then mix for about 5 minutes more on low speed.

Scrape down the bowl to insure a smooth batter during mixing.

The temperature of the finished batter should be 70 to 75 deg. F.

This is a suggested formula, the amount of flavorings, salt and leavenings, in particular, being subject to experiment to determine the most desirable amounts.

Formula from A. E. Staley Mfg. Co.

FORMULA NO. 562

Base for Parfait Icing

Fondant icing	19 lb. 2 oz.
Emulsifying shortening	4 lb. 10 oz.
Salt	1 oz.
Evaporated milk	1 lb. 3 oz.

Directions

Either purchase a high-quality fondant icing or make it by boiling sugar, water and glucose—or sugar, water and an inverting agent—to a temperature of 238 to 240 deg. F., cooling to 99 deg. F. and then creaming to a light, snowy mass of microscopic crystals. Care must be taken in the selection or preparation of the fondant base because fondants cooked to less than 238 deg. F., fondants thinned to a consistency suitable for coffee cake icings, and fondants containing egg albumen or marshmallow powders are not suitable for parfait icings.

Blend the fondant with the shortening and salt, on slow speed, then cream 2 minutes on medium speed. Incorporate the evaporated milk completely, again on slow speed, and cream on medium speed for 3 minutes.

Formula from Brown's Hungarian Corp.

FORMULA NO. 563

Apricot Parfait Icing

Base icing, Formula 562	23 lb. 8 oz.
Stewed apricots	1 lb. 7 oz.
Lemon gratings	1 oz.

Directions

Prepare apricots by boiling the washed fruit for 5 minutes with an equal weight of water, in a covered steam-jacketed kettle. Practically all of the liquid should be absorbed in the fruit.

Chop the apricots so that their skins are well broken, combine with the base icing and lemon gratings, then cream 2 minutes on medium speed.

Formula from Brown's Hungarian Corp.

FORMULA NO. 564

Baker's Jelly

Fruit juice	26 lb.
Water	38 lb.
Citrus pectin, 100 grade, rapid set	27 oz.
Granulated sugar (sucrose)	105 lb.
Color	if desired
Flavor	if desired
Citric acid solution, 50 percent	15 fl. oz.*

*3 fl. oz. for each 30 lb. container of finished jelly.

Directions

This formula is adjusted for 30 lb. containers.

The citric acid solution is made by dissolving 1-lb. of citric acid in 1 pint of hot water.

Put the fruit juice and water in a kettle and heat to 190 deg. F. Mix the pectin thoroughly with about 10-lb. of granulated sugar. Add this mixture all at once to the hot juice solution, with continual stirring. Continue to stir while bringing to a boil. Boil vigorously for 1 minute, then add the balance of the sugar and cook as quickly as possible to 222 deg. F. or above. The final temperature must be 10 deg. above the boiling point of water at the factory. Add the color and flavor if they are used.

Put 3 fl. oz. of the citric acid solution in each 30-lb. container and then fill quickly with the hot jelly. Do not stir. Skim momentarily. Allow to stand until set.

Yield is approximately 153 lb.

If the finished jelly is too firm, reduce the quantity of pectin by a few ounces. If the jelly sets too quickly, reduce the quantity of acid solution in each 30-lb. container by about ½ fl. oz.

Formula from California Fruit Growers Exchange.

FORMULA NO. 565

Pennsylvania Potato Cake

Flour	95 lb.
Granular potato flour	5 lb.
Water	64 lb.
Nonfat milk solids	5 lb.
Granulated sugar	10 lb.
Shortening	15 lb.
Salt	2 lb.
Yeast	3 lb.

Directions

Mix the dough in the usual manner and set at about 82 deg. F. Allow time for full proof, 1½ to 2 hours, for first punch. Take to the bench in 30 minutes.

Scale the dough 8 or 9 oz. for each cake. Round up into a ball, which must be washed with water or with egg wash. Dip into a streussel topping and place in deep, medium-size pie tins. Proof and bake.

Formula from Roger Bros. Seed Co.

FORMULA NO. 566

Anise Drops

Whole eggs	3 lb. 12 oz.
Sugar	5 lb.
Salt	⅛ oz.
Pastry flour	5 lb.
Anise flavor	¼ oz.
Ammonia	"A pinch"

Directions

Warm together the eggs, sugar and salt, then beat until very light. Fold in the flour, ammonia and flavoring. Tube out on wax paper to make cakes the size of a dime. Let dry for 10 hours, then bake at 300 deg. F. The drops may be colored red and green, if desired.

Formula from Swift and Co.

The "HANSON" milk sediment tester

KNOW which producer is supplying DIRTY MILK

The only accurate check on milk sediment content is to test each can before it is emptied into the weigh tank.

Why accept blame for the carelessness on someone's farm? A simple pull on the plunger rod handle deposits any sediment on the disc, which can be easily removed for accurate records and comparison.

The plunger rod, ferrule and internal parts are *stainless steel.* The Tester has no internal seams or crevices, or plating on any part. Write for full details and prices.

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Try TRI-CLOVER
SANITARY FITTINGS
VALVES and PUMPS

Ways To Save Water In the Food Plant

(Continued from page 100)

other or overlap excessively. To correct excessive impingement, the spacing may be changed, or, in the case of flat sprays, the nozzle header holes may be staggered slightly.

Nozzles should be of such design as not to clog easily, and their delivery or discharge rate should be ample to meet the particular requirements. The operating water pressure should likewise be ample, since scanty or low-pressure sprays are less effective and require more water for a given cleaning job.

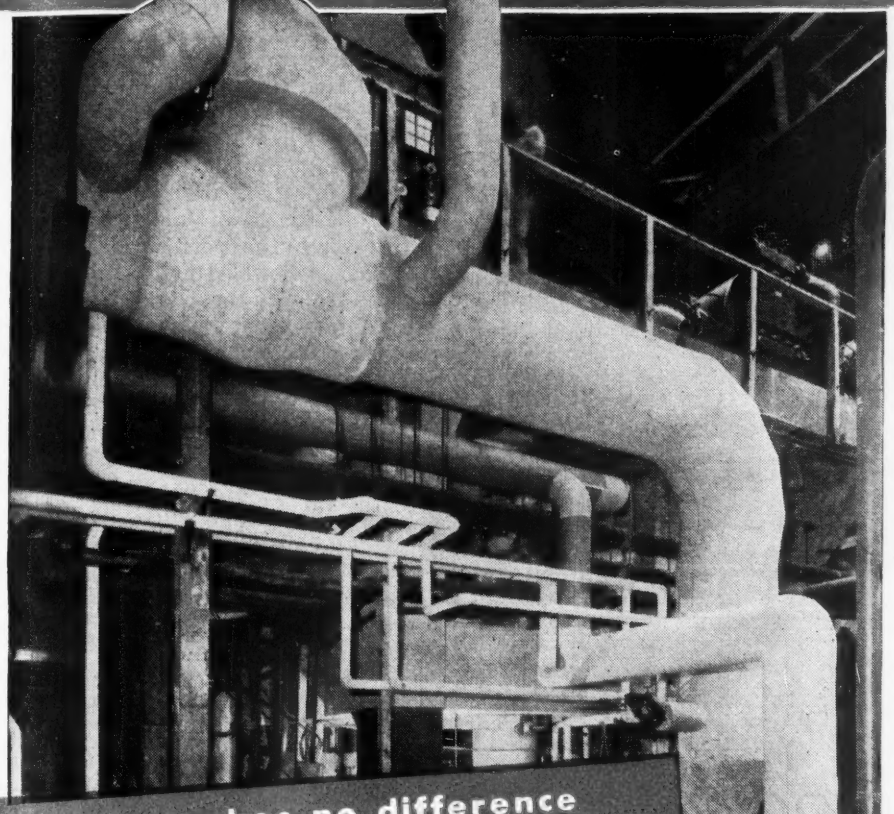
A Precaution

It might be well at this point to note a precaution in regard to wash water. In instances where pure water is scarce and a supply of unknown or questionable quality is readily available, it would be both unwise and improper to use the latter for product washing. The use of a contaminated supply, based on the contention that the water used for preliminary soaking or washing will become contaminated with dirt anyway, is not in accordance with scientific reasoning. There is a difference between the reuse, for preliminary washing, of water initially of good sanitary quality but containing some material from the product being processed, and the use of water initially polluted. Bruised or cut fruits or vegetables, for instance, would be exposed to inoculation with harmful organisms when washed in polluted water. Where such organisms are of a heat-resisting type, product spoilage may be only one of the possible results.

Well water made safe by chlorination is used in many food plants, and chlorinated sea water is used for fish washing prior to freezing. Water may also be sterilized by ozone or ultraviolet rays. But regardless of the method used, it should have the approval of the local jurisdictional authorities. As a suggestion, it might be well to investigate the sterilization method to be used so that the quality, taste or appearance of the finished product will not be impaired.

Peeling — Another important water consuming item is fruit and vegetable peeling. Peeling methods generally are not compared from the standpoint of water consumption but on the basis of percent trimming loss of product. No comparison will be made here of relative water economies.

You can safely entrust any job, large or small, to ARMSTRONG'S CONTRACT SERVICE FOR HEAT INSULATION



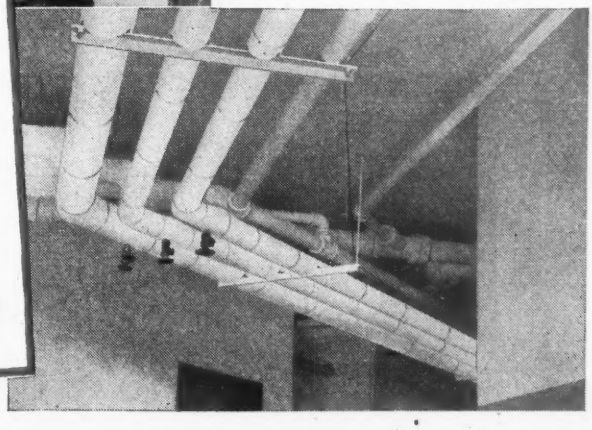
AMPLE RESOURCES of men and experience are available in Armstrong's Contract Service to tackle any size job, any time. The fine reputation enjoyed by this service has been built by doing all jobs equally well. Four elements are present in every job Armstrong undertakes: (1) Sound engineering skill and experience; (2) materials of tested efficiency; (3) expert craftsmanship; (4) careful supervision and assumption of full responsibility for every phase of the work—planning, materials, and workmanship. For complete information, write today to Armstrong Cork Co., Building Materials Div., 4211 Concord St., Lancaster, Pa.

Size makes no difference

Efficient insulation of steam heating lines is just as important to the Mercy Hospital in Rockville Centre, N. Y., as is proper covering of 30" exhaust piping to a giant power plant in Philadelphia. Both jobs are shown here.

On the big job, combination covering of Hy-Temp insulation and 85% magnesia was specified. On the small piping shown below, 4-ply aircell pipe covering was specified.

With Armstrong's Contract Service no job is too large, and none too small, to receive careful attention and skillful installation. You can get this dependable service for your heat insulation job through Armstrong offices in most of the nation's industrial centers.



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FLOOR BRUSHES
SCRUB BRUSHES
DUST BRUSHES
WET MOPS
DRY DUSTING MOPS
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All Sizes and Weights

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HANDLING

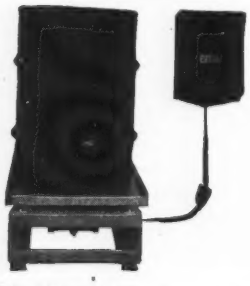
"Hard-to-Pack"

MATERIALS?

SYNTRON

"Pulsating Magnet"

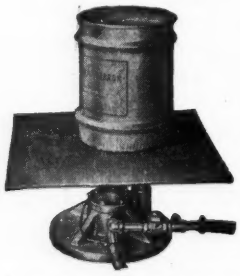
VIBRATORY PACKERS



3600 Vibrations per minute

"Hydra-Pulse"

HYDRAULIC JOLTERS



100 short, sharp jolts per minute

WILL PACK THEM DOWN!

Write for catalog literature

SYNTRON CO., 460 Lexington Ave., Homer City, Pa.

The product leaving the abrasive peeler is practically clean, having been thoroughly washed in the peeling process, and may require no more than a slight rinsing. The product after steam, flame, lye or other chemical peeling must be washed free of skin, and in many instances substantial water savings can be made in this step. An example of this is the experience of a potato dehydrating plant using a steam peeler. Water saving is accomplished by employing a specially constructed skin separator or water-recovery unit. A tank or catch basin is fitted with a perforated trough in which a screw conveyor revolves. The wash water carrying the skins is caught in the trough. The skins are discharged by the conveyor while most of the water passes through the perforations into the basin below. After passing through a strainer, the water is repumped to the washer spray nozzles, making the process continuous. An auxiliary fresh water spray directly over the basin serves a twofold purpose in suppressing surface foam and supplying makeup water. The unit is shown in Fig. 3. Water consumption for the peeling unit was cut more than half by this equipment and the recovery unit installation paid for itself entirely in one month.

Heat Processing

In heat processing using steam or hot water, economy of the medium also means economy of fuel. It is double waste to allow the continuous escape of clean process steam from equipment vents. This applies particularly to the steam used in heating jackets and closed coils, which generally can be trapped and returned to the boiler with little loss.

Economy in product heating operations that require a continuous supply of steam and makeup water is largely a matter of control. A careful, experienced operator can be expected to run his plant efficiently and economically. But where such supervision is lacking, it is usually found more profitable to install thermostatic and other automatic controls, at least for the principal operations, rather than to rely on haphazard manual control. The writer does not wish to have it construed from this that the capability of the operator is the criterion for installing control devices, for it need hardly be said that control instrumentation improves the efficiency and economy of any plant, regardless of the operator's skill.

When the heating medium is hot water, recirculation offers the best

Three Little Men...
MOISTURE brings sogginess
AIR... steals freshness
LIGHT spoils aroma and flavor
Who aren't here!
No matter how hard they try, these 3 package pirates can never penetrate Reynolds Aluminum Foil to steal freshness and flavor.

Before the war most of America's famous brands... cigarettes, candy, chewing gum and many foods... were packaged in Reynolds Foil. Already manufacturers are planning to return to foil-wrapped packages... as soon as available for civilian use... proof that foil best preserves freshness and flavor.

Foil is a complete moisture—and moisture-vapor barrier. If your problem is to keep moisture *in*—foil can solve it. If it is to keep moisture *out*—foil can solve that, too! Consult Reynolds!

For many products foil has a vitally important advantage. Foil is *light-proof!* Light is a major cause of rancidity. Many foods need foil's light-proof protection. Foil preserves flavor, freshness too. Reynolds have made a special study of food packaging. Ask us for data on the many new developments.

Shipment of war material has made the most stringent demands ever known in the packaging field. Reynolds Laboratories developed 90% of the foil packages of war. This experience is now being used in the development of vastly improved packaging for consumer goods—from peanuts to pistons! A corrosion-proof method of packaging metal parts is one development that might interest you!

Reynolds, for 25 years the resourceful and progressive leader in metal foil packaging, is now perfecting many new, revolutionary protective packages. Consider foil—consult Reynolds. Write Reynolds Metals Company, Richmond 19, Virginia.

REYNOLDS FOIL

PURE ALUMINUM

THE FRESH-FLAVOR WRAP

REYNOLDS METALS

FAMOUS FULLER FIBER BROOM
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FLOOR BRUSHES
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HANDLING
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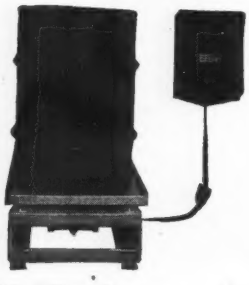
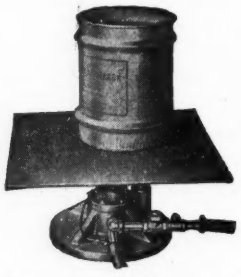


3600 Vibrations per minute

"Hydra-Pulse"
HYDRAULIC JOLTERS



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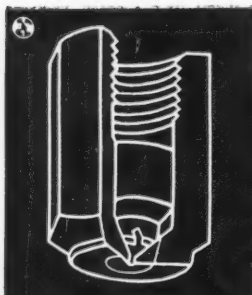
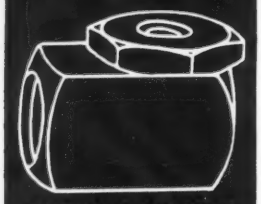
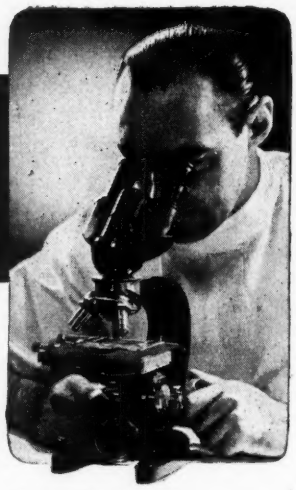


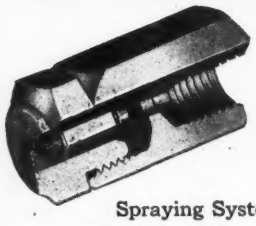


SPRAYING SYSTEMS NOZZLES ARE AVAILABLE IN TYPES AND SIZES FOR EVERY FOOD HANDLING AND PROCESSING APPLICATION

Often

THE ANSWER IS SPRAY NOZZLES





Spraying Systems Spray Nozzles alone can often provide the solution to problems in food processing or manufacture. These engineered nozzles are applied today in such typical operations as the spray drying of eggs and milk and the manufacturing of powdered soaps and ready-mixed cake flours. Other applications are found in food washing and evaporative cooling. Write for Catalog No. 22 . . . an engineering reference catalog giving complete information on thousands of Spraying Systems Spray Nozzle types and sizes.

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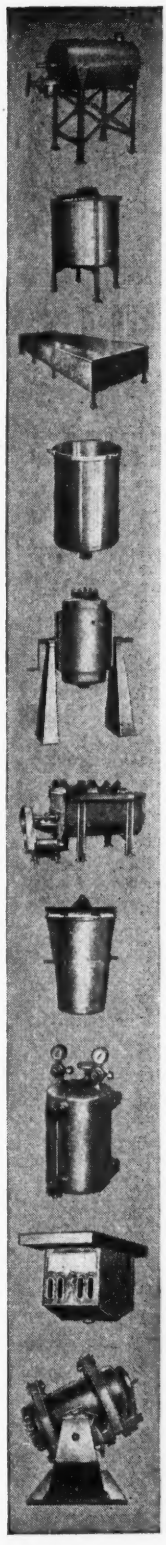
economy. Continuous recirculation is possible where there is little or no water loss, as in a closed jacket or coil or where water is not entirely wasted through an overflow or purge. Where makeup water for the steam boiler or hot water tank is required, its most economical source is the waste discharge water from some heat exchange process, further preheated, if possible, by waste heat. Milk, juices and other liquid food products are cooled by water in coolers or heat exchangers, and the outgoing water is generally economical boiler feedwater. There are circumstances, however, which may make this saving of water and fuel impracticable or uneconomical. For instance, well waters may be excellent for cooling because of their low temperature, or they may possess qualities making them especially suitable for certain purposes, but they may at the same time be bad scale producers and useless for the boilers unless treated. An example of this is found in the brewing industry. Among other constituents, natural waters of good brewing quality carry a high percentage of calcium sulphate, a principal contributor to hardness and scale formation. Thus, water which is excellent for brewing would require considerable treatment to condition it for boilers or for use with detergents. On the other hand, where the available supply is initially suitable for boiler feed or for detergent use, a more satisfactory economy often is possible, since it is necessary to treat (Burtonize) only the water used for brewing, which amounts to about one-tenth of the total water consumed.

Economy in the Brewery

Brewery water economy, furthermore, lies not so much in the brew water itself as in the other plant uses. Although the generally accepted figure for the water requirement is between 10 and 15 bbl. of water per 31-gal. barrel of finished beer, it is possible to reduce this appreciably by using an arrangement such as that illustrated in Fig. 2. Using approximately the same layout, one New York brewery engineer reports his water requirement, exclusive of bottle shop use, to be not more than 5 bbl. per barrel of beer produced.

Economy measures include steam or hot water circuits arranged so that the heating medium flows through several units in the order of their decreasing temperature requirements. Other savings in water and fuel result from the use of heat



EFFICIENT PRODUCTION IS IMPOSSIBLE WITHOUT EFFICIENT EQUIPMENT

Peacetime changes have meant decreased production for many industries, however, domestic markets plus the burden of helping to feed Europe are keeping food demands at a high level. Naturally, this heavy production requires efficient, economical equipment.

Over a period of 64 years, KOVEN has specialized in designing and manufacturing individualized equipment built to exact needs and food executives know they can depend upon this equipment to assist them through busy days. If you are in need of advice...the assistance of a trained KOVEN representative is at your disposal. This consultation will not obligate you. Call or write to KOVEN.

Among the many KOVEN products in all the leading commercial and non-corrosive metals:

Stainless Steel
Aluminum Sheet Fabrication
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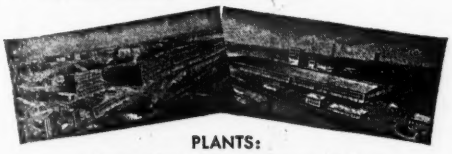
Pails, Special Heavy
Pans, All Types, All Metals
Sinks, Scullery and Factory
Tables, Galvanized or Monel
Tanks, All Types, All Metals
Kettles, All Types, All Metals

WATERFILM Industrial Heating Boilers



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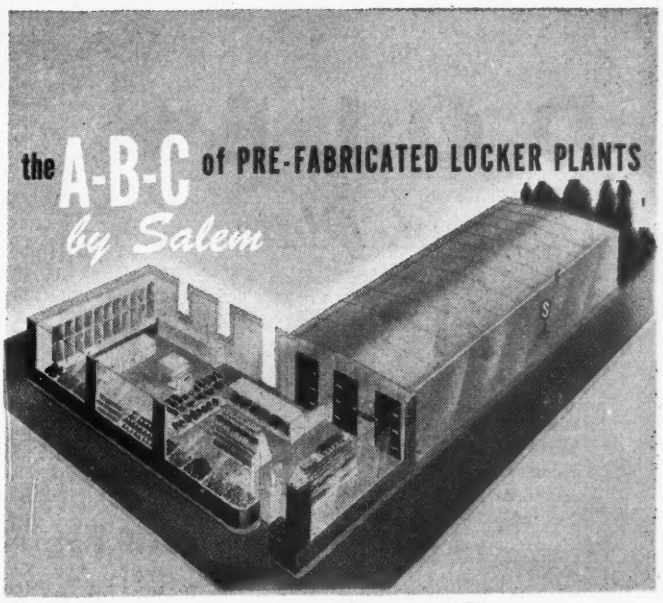
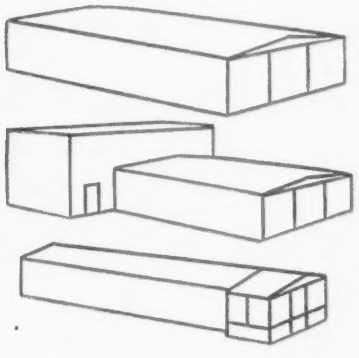


Production Line Savings Passed on to You

A- Pre-fabricated means a self-contained, weather resisting metal building, complete with insulation, refrigeration equipment, and lockers. Each unit is standard (40 ft. long, 10 ft. high and 8 ft. wide.) You can place as many as four units together. One unit holds 130 Walk-in or 120 Automatic type lockers.

B- Salem developed pre-fabricated locker plants to meet two needs: (1) provide an economical way of expanding present crowded locker plants; (2) provide an opportunity to establish neighborhood plants or branch plants.

C- Your present facilities will determine whether you should buy a custom-built locker plant or pre-fabricated units. Let Salem help you decide. Salem is the only manufacturer of the complete locker plant line—custom-built or pre-fabricated—automatic or walk-in.



Three pre-fabricated units (360 automatic lockers) side by side. Each unit is 40 feet long, 10 feet high, and 8 feet wide.

★

This illustrates how you can use Salem's pre-fabricated units to enlarge your present store or locker plant.

★

Here is a single pre-fabricated locker unit (120 automatic lockers), ideal for enlarging your present food store or locker plant, or establishing a branch or suburban locker plant.

Write for the new booklet on Pre-Fabricated Locker Plants and full-color illustrations of typical installations.

A Locker Plant is a long term investment. Buy your locker plant from engineering specialists.

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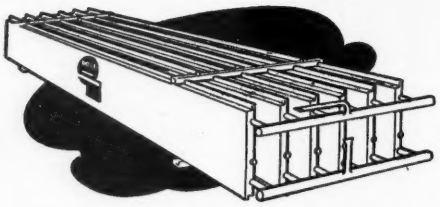
SALEM, OHIO
SALEM ENGINEERING LTD. (CANADA) TORONTO, ONTARIO

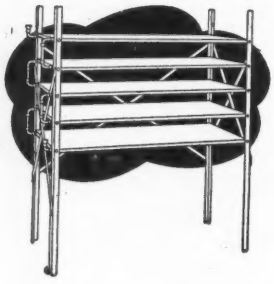
DOLE

Vacuum Plate



Dole Locker and Storage Plates Available in different sizes.

REFRIGERATING UNITS



Quick Freeze Plate Unit Available in different sizes.

for

- **QUICK FREEZING**
- **PRESERVING**
- **TRANSPORTING**

FOOD

Dole plates are used and recommended by outstanding Refrigeration equipment manufacturers. Used by the Government for Cold Storage Rooms in the U. S. A. and Foreign Bases.

Write for Catalogs, Engineering assistance or a representative to call — no obligation

DOLE Vacuum COLD PLATES — REFRIGERATION PURPOSES

DOLE REFRIGERATING COMPANY
5910 N. Pulaski Rd., Chicago 30, Illinois
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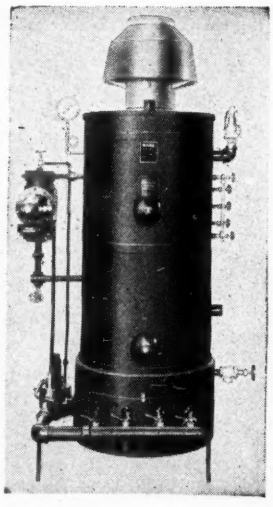
Include the KANE . . . in Your Plans



When considering new equipment, or plant expansion, — include the nationally accepted and economical *Kane Boiler*, — for every service where an automatic gas-fired source of steam is indicated — Sizes up to 30 H. P. Advantages are: *Precise temperature control; Cleanliness; Minimum space required; Long, trouble-free service life;* and *Kane Boilers* are built to A. S. M. E. Standards.

Plan steam boiler requirements well in advance to be sure of having steam when needed.

MEAES KANE (DEELDT

Manufacturers of Automatic Steam Boilers for over a third of a century

1903-1915 EAST HAGERT STREET, PHILADELPHIA

exchangers, elimination of deposits on heat transfer surfaces and use of low pressure steam for vacuum cooking. Vacuum pans and evaporators, however, require considerable quantities of condensing water.

Part II of Mr. Reichman's article will appear in the December issue.— THE EDITOR.

Reference

1. Water Pollution in the United States. Third Report of the Special Advisory Committee on Water Pollution, National Resources Committee, House Document No. 155, Government Printing Office, Washington, D. C.

—End—

Is Your Organization Stagnating?

(Continued from page 73)

has gone the spark, the energy and the stimulation which had made the organization click. Organizational stagnation has set in. One by one the various divisions of the business fall into line with the pattern laid down by the boss. The sales manager tries for a time to overcome the handicap, but his efforts are not recognized, nor is adequate support given to his long-range programs. Soon, too, he follows the easiest way and begins to coast. And then it is only a matter of time until the salesmen themselves have devised a defensive formula that is easier of execution and yet produces sufficient results to be in harmony with top-executive tempo.

Down, Down It Goes

The works manager finds himself in a similar position. The boss used to look forward with eagerness to better production methods and machines, but now he seems satisfied. The attitude always seems to be the same when analyzed: "We're doing O.K., so why spend the money on new and better methods and machines." So the works manager slackens his pace to that of the boss, and the cancerous growth is started throughout the factory organization. Down, down, down it goes, finally rooting itself well in the minds of the workers themselves. Soon, too, the other major divisions of the company are affected.

The foregoing pattern of events is no myth. It is happening every day in American industry. The food industry is no exception. It is perhaps even more susceptible to contracting this contagious disease than many others. Let there be no complacency in the minds of any one who influences or controls the production or distribution of edible

CHEFS SAY:

"CARBON DIOXIDE CD/Fog FIRE EXTINGUISHER

IS AS HARMLESS TO FOOD AS A BABY'S BREATH"

15-LB. SIZE

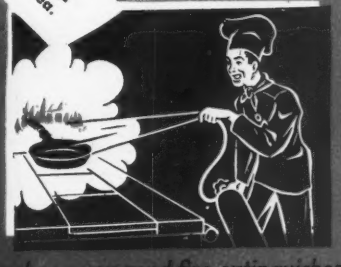
CD/Fog combines fire protection with food protection. This famous carbon dioxide fire extinguisher does a quick, efficient job of putting out fire — yet it is absolutely harmless to food — as mild as the breath of a baby. CD/Fog can be used directly on food without affecting taste, appearance, or aroma. It is as clean and pure as the sparkle in soda water. For kitchens the two and four pound sizes are recommended.

WHERE TO USE CD/Fog

Quickly effective on Class B and C fires (gasoline, oil, electrical, flammable liquid, grease, illuminating gas, paint).

HOW TO USE CD/Fog

Carry close to fire. Hold horn with one hand, open valve wide. Direct at base of fire and gradually blanket entire area.



IF IT'S GENERAL IT'S DEPENDABLE

Remember—you need fire extinguishers in your automobile

Let General Protectioneers prescribe the right extinguisher for your every fire hazard.

THE GENERAL DETROIT CORP.

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Distributors in principal cities

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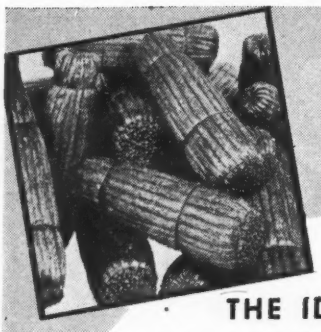

PURE VANILLA
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THE IDEAL CONCENTRATE
FOR MANUFACTURING TOP QUALITY
PURE VANILLA EXTRACT

Produced by Felton from finest quality beans, assuring outstanding flavor character. Simply dilute to requisite strength. Economical and easy to use.

Write for sample and current quotations for spot delivery or contract.

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Branches in Boston • Philadelphia • San Francisco • Los Angeles • St. Louis
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Manufacturers of Flavors,
Essential Oils and Aromatic Chemicals

FELTON Quality

There's a Felton Flavor for your Product.
Tested in the Batch. Perfect for the purpose

products, for there is today a revolution under way in the food industry. Make no mistake that past success and past and present acceptance of products by the public is a criterion of enduring profits. Agricultural production methods are advancing rapidly. Basic cost relations between various raw foods is changing in unpredictable ways. Industrial production methods are rapidly advancing. Technological research on processes and mechanical research on machines will bring to the consuming public foods of better quality, of better value and in more convenient forms.

No Time to Stagnate

The food industry is in an era of transition. This is no time to contract a case of organizational stagnation. At the present time, sickness will be doubly severe. Now is the time for the top executives of every concern in every branch of the food industry to have a serious consultation with itself about itself. Its state of mind should be analyzed carefully, its capacity to lead and stimulate should be gaged. Above all, it should not hesitate to step aside and delegate responsibility and authority to successfully meet the challenge of the century.

—End—

How To Make Canned Hamburgers

(Continued from page 86)

thermostatic control over the temperature of the cooking fat (to give the desired variations in temperature) and by means of a variable-speed drive on the conveyor carrying the patties through the cooking vat (to give the time desired variations in cooking time), the variations in the composition of the patties can be compensated for and a hamburger of satisfactory uniformity obtained.

Canning

As the trays of surface-cooked hamburgers emerge from the fat, they are held on a conveyor over a drip pan at the discharge end of the vat for about 5 minutes and drained free of excess cooking fat. After draining, the trays are packed by two's into 300x200 tinned cans.

Because of the resilient texture of the patties (resulting from their raw-meat center at the end of the cooking and draining period), the top pattie bulges above the top of the open can. This gave trouble in the beginning because it resulted in meat

OVER 400,000 SOLD

• Quicker Heating
• Small Size
• Light Weight
• One Moving Part
• Low Price

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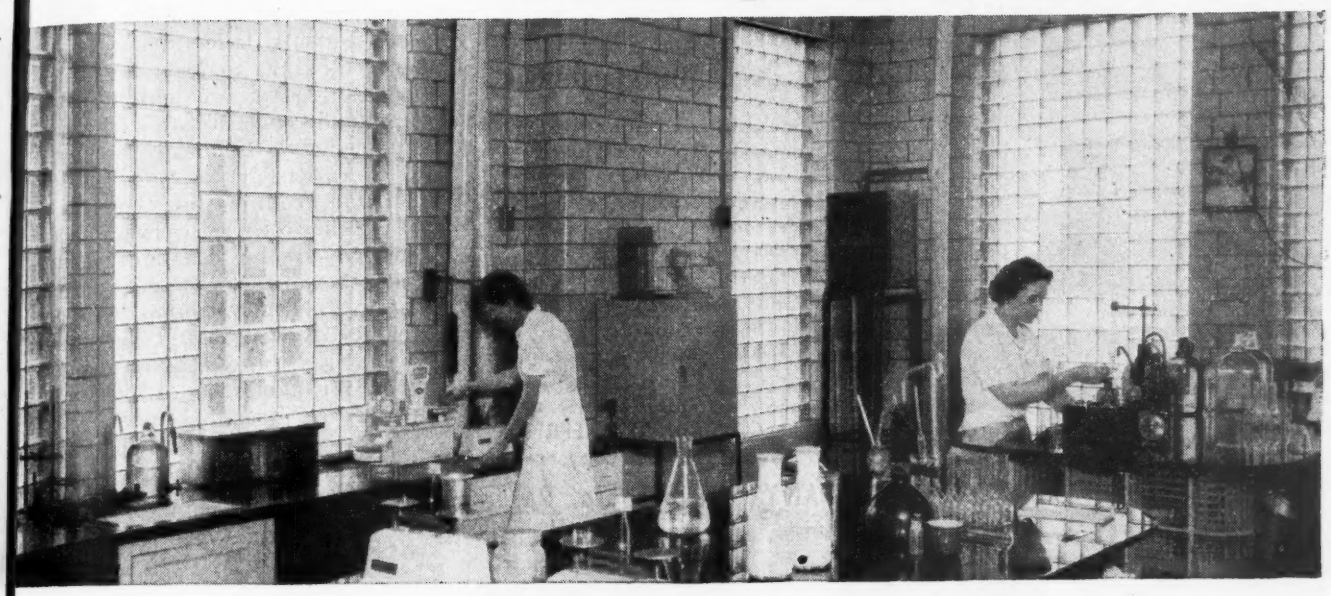
YARNALL-WARING CO., 127 Mermaid Ave., Phila. 18, Pa.

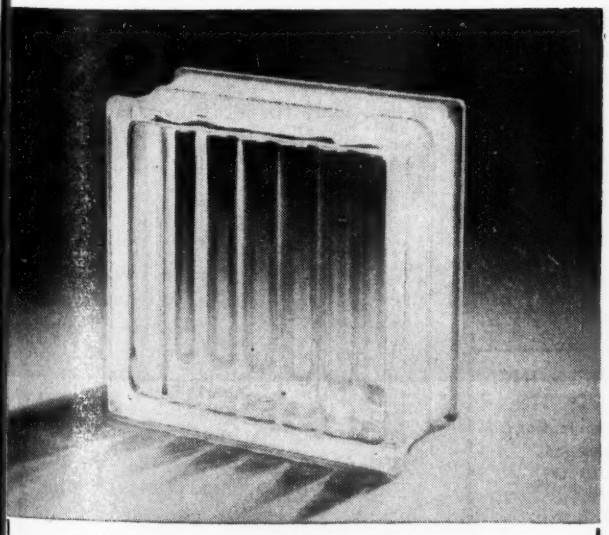
YARWAY

IMPULSE STEAM TRAP

MEETING MODERN STANDARDS WITH *PC Glass Blocks*



IN THIS DAIRY LABORATORY absolute cleanliness is imperative. Temperature and humidity must be maintained at desired levels. Yet an ample supply of natural light is required for this precision work. The owners found that one unique building material would help solve all these problems. That is why they installed PC Glass Blocks in large lighting panels.



THE NEW ARGUS PATTERN—Especially designed for high light transmission, good light diffusion when laid with flutes either vertical or horizontal. Has smooth outside faces—parallel, identical interior flutes. With easily cleanable smooth faces, this conventional pattern is designed for both decorative and utilitarian use.

IF YOU are concerned with plant construction and modernization, let us remind you that PC Glass Blocks are attractive and practical. Furthermore, that there are many ways in which PC Glass Block construction serves and saves in new and modernized food processing plants.

PC Glass Blocks distribute generous floods of daylight over wide areas. Insulating properties lessen heat losses through lighting areas, help maintain temperature and humidity levels, ease the load of air-conditioning and heating equipment. Infiltration of chilling drafts, gritty dust, is prevented because PC Glass Blocks are an integral part of the wall. They exclude unpleasant sights, dampen disturbing sounds.

Glass surfaces are sanitary, are quickly and easily kept immaculately clean. PC Glass Blocks do not break readily, rarely if ever need repair or maintenance.

In planning new construction and modernization you can insure added beauty, sanitation and economy by using PC Glass Blocks. Pittsburgh Corning Corporation, Room 779, 632 Duquesne Way, Pittsburgh 22, Pennsylvania.

PITTSBURGH PC CORNING

ALSO MAKERS OF PC FOAMGLAS

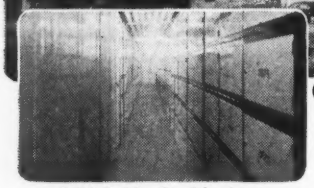
GLASS BLOCKS

Distributed by

PITTSBURGH PLATE GLASS COMPANY

and by W. P. Fuller & Co. on the Pacific Coast

PITTSBURGH CORNING CORPORATION
632 DUQUESNE WAY, PITTSBURGH 22, PA.



5,000 Refrig. Food Lockers

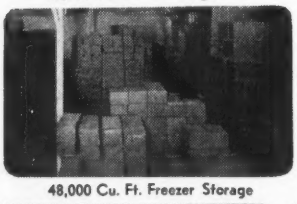
This COMMUNITY REFRIGERATION CENTER Serves Over 15,000 Customers

Pat Denham's model plant, covering an entire block at Oklahoma City, provides ten distinct services: it has the world's largest food-locker system, safekeeps 10,000 furs, operates a general freezer storage, makes crystal-clear ice, processes all kinds of foods, does quick-freezing, sells frozen foods, runs a restaurant, has a gas station, and includes a big laundry. Frick refrigerating, ice-making, and air conditioning equipment carries all the cooling loads.

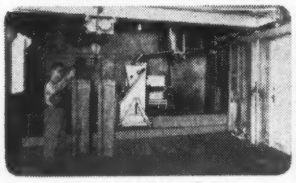
Bulletin 126 tells how any town or city can profit from a similar COMMUNITY REFRIGERATION CENTER. Write for your copy now.

FRICK COMPANY, Waynesboro, Pa.

10,000 Furs in Storage



48,000 Cu. Ft. Freezer Storage



14-Ton Ice-Making System

Air Conditioned Sales Room

Restaurant Service

METAL FOIL can take it!

WRAP your product in metal foil and *know* it's well protected! That's because Trans-Pac's metal foil packages safeguard it from heat, moisture and dirt right up until the minute the package is opened.

Whether it's metal foil or any one of many other superior packaging materials, Trans-Pac can plan your packaging needs now. In addition to our own staff, we work closely with the engineering and research divisions of the leading manufacturers of packaging supplies.

Our long experience dealing with diversified products equips us to turn out the best in modern packaging. We should be happy to advise you on your particular post-war packaging needs.

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PACKAGES PRODUCTS
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being forced into the space between the edge of the lid and the top edge of the can during closing and prevented a complete seal. This difficulty was overcome by installing a mechanical compressing device ahead of the closing machine to press the patties in the can until some of their water content was forced out into the can. This water is subsequently taken up during the retort cooking, to leave the hamburgers free of any objectionable water and rendered fat in the can.

Immediately following the pressing operation, the cans continue via a standard canning-line conveyor to the clincher for a loose closing. Then they go to the closing machine, where they are sealed under approximately a 20-in. vacuum. To assure sterility as well as full cooking of the patties, the sealed cans are retorted for 60 minutes at 240 deg. F.

With the foregoing methods, and with a production line as shown in Fig. 1, the 6-oz. cans of hamburgers were produced for the Army at a rate of 6,000 cans (12,000 hamburgers) per hour.

—End—

Quick Cooling of Cream Improves Butter

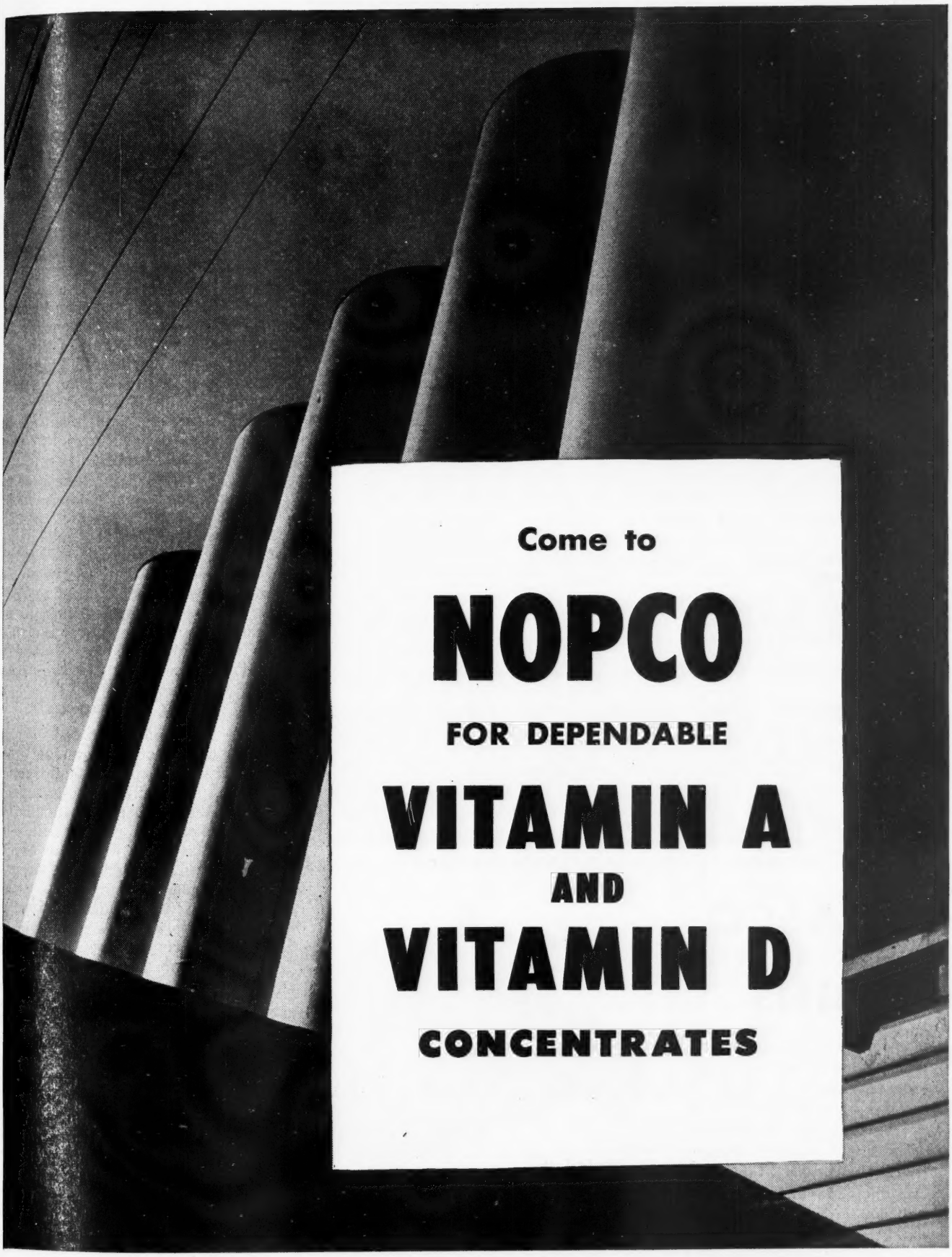
(Continued from page 89)

picked up by the truck, arrived at the plant at a temperature of 70 deg. F. A 0.05 percent increase in acidity had occurred, representing a percentage increase over the original acidity value of only 7.1. It will be noted that the station temperature was 88 deg. F. and the average temperature for the 24-hour period was 80 deg. F.

Trial 2 conducted under more adverse temperature conditions also gave excellent results when the cream was cooled to 56 deg. F. but somewhat less desirable results when cooled to only 60 deg. F. In Trial 3, the average temperature for the 24-hour period was 74 deg. F., which resulted in considerably less acidity development in the control sample than occurred in the other two trials. Acidity increases in the cooled samples were held to a minimum.

Results of these field tests indicate that the unit cooler effectively cools cream under practical operating conditions. In addition, the texture of the cream is improved so that it is smooth and flows readily. Also it is in ideal condition for sampling.

Results of these test holdings are



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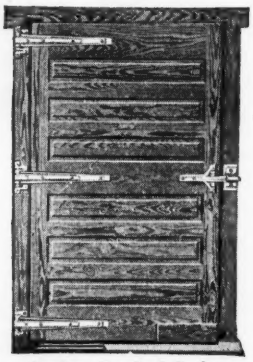
Pioneer producers of *natural* Vitamin A and Vitamin D Concentrates, Rice Bran Concentrate and Calcium Pantothenate

GUARD

Guard Against Deterioration!

Variable, uncertain storage temperatures defeat the purpose of your cold storage rooms — they injure your reputation for quality.

With rugged JAMISON-BUILT Cold Storage Doors on guard, your products are safe. INSTALL THEM NOW! It will pay you!



Jamison Standard Cooler Door. See Bulletin 122.

Consult nearest branch or address

JAMISON Cold Storage DOOR CO.

Jamison, Stevenson and Victor Doors

HAGERSTOWN MARYLAND

JAMISON-BUILT COLD STORAGE DOORS

GLASCO TRADE MARK PRODUCTS

CUSTOM-FABRICATED METAL EQUIPMENT FOR BETTER FOOD PROCESSING

INDUSTRIAL CUSTOM-FABRICATORS FOR 35 YEARS

GLASCO STAINLESS STEEL BINS

Many of the most successful food plants in the United States have ordered — and re-ordered — this or other units of GLASCO *Fabricated-to-Order EQUIPMENT*, comprising Containers, Buckets, Trays, Trucks, Bins, Tanks, etc. Our long experience in this field well qualifies us to advise you on your equipment problems to save time and expedite production.

GLASCO EQUIPMENT IS FABRICATED IN ALL METALS

Our plant and facilities are complete for the fabrication of equipment from the following metals: aluminum, copper and brass, galvanized steel, lead and zinc, Monel Metal, stainless steel, stainless-clad, steel and iron, structural steels and tin.

GUSTAV GLASER CO., INC. AND ITS SALES SUBSIDIARY GLASCO EQUIPMENT CORP.

HOME OFFICE & PLANT: TWO WAIT ST., PATERSON, N. J.

NEW YORK CITY OFFICE: 501 FIFTH AVE.

given practical value by the fact that use of the cooler has made possible transportation of cream from the receiving station to the plant in an unrefrigerated truck on an overnight haul without appreciable increases in acidity. This result was obtained in spite of the fact that the cooled cream was placed on the truck along with the uncooled cream and without any extra precautions. If all the cream on a truck were cooled in this manner, there not only would be less rise in temperature during transportation but less multiplication of organisms and less increase in acid. A corresponding improvement would result in the quality of butter made from the cooled cream over that made from uncooled cream.

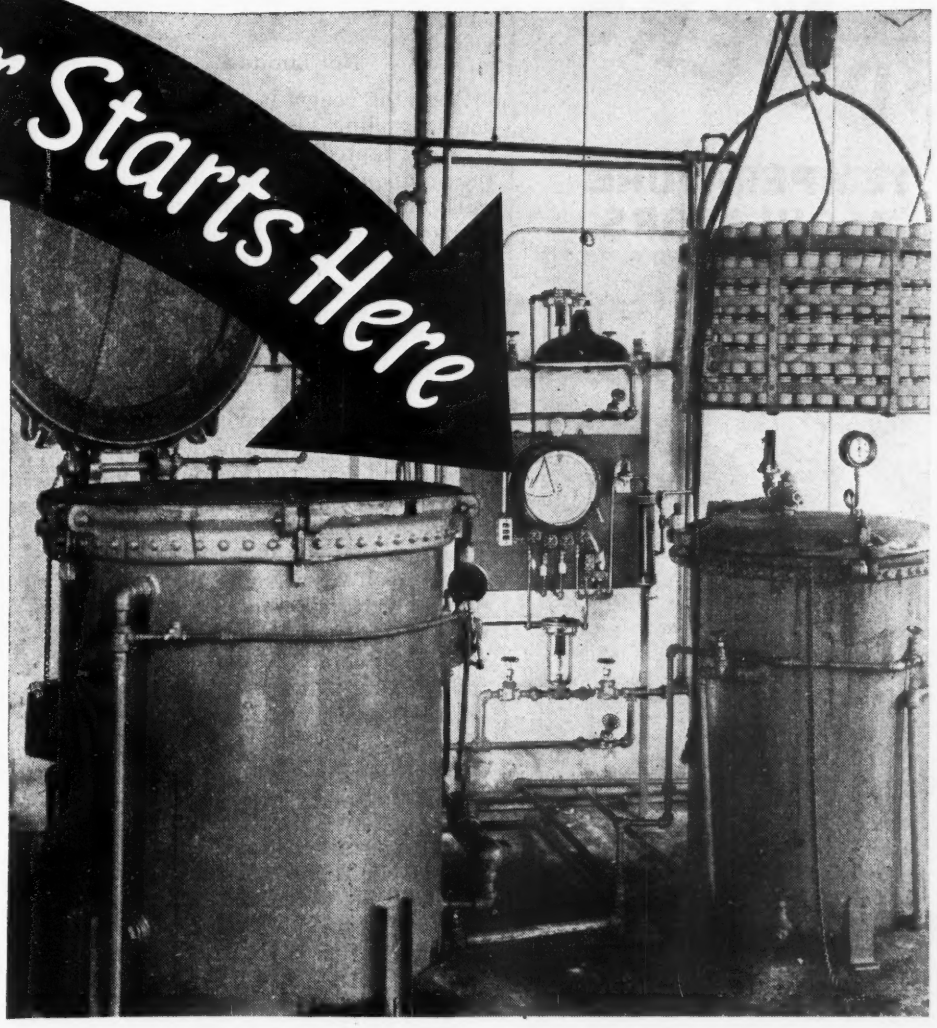
The effective principles of the Erickson unit cooler are: (1) Cooling by direct expansion is undoubtedly more effective than cooling through some intermediate material such as water or brine. (2) The fluid being cooled is continuously circulated over the cooling surface. (3) There is no time lag. Microbiological changes are stopped at once; organisms do not continue to develop during the cooling as they may in the case of a cooling operation that requires hours for completion.

Other Applications

The unit cooler also can be used to cool heavy-bodied materials other than cream. In plants manufacturing cultured milk in 10-gal. cans, cooling the product after incubation is a problem. The reduction in temperature is slow when the can is placed either in cold water or in a cooler. Unless cultures are cooled promptly after the desired incubation, the organisms continue to grow, resulting in overripened and weakened cultures. The consequent loss of flavor is serious from a quality standpoint if the product is intended for consumption. The loss of vigor is important if the culture is used for manufacturing purposes, as in cheese making, or if it is used to inoculate larger batches of starter.

In various manufacturing processes, the cooling of sirups and flavoring materials presents problems due to the heavy bodies of the material. From a quality standpoint, the chocolate sirup used in ice cream is improved by thorough cooling immediately after manufacture. In the carbonated beverage industry, the sirups used to make the various beverages must be cooled before being added to the carbonated water to avoid loss of carbon dioxide. The unit cooler is suited for the solution

Flavor Starts Here



Foxboro Elapsed-Time Temperature and Pressure Controller installed on retort at Delham Food Products Company, Cambridge, Massachusetts.

HOW Foxboro Elapsed-Time Temperature Controllers Help Delham Food Products Company Make Tastier Meat Spreads

Knowing that no additional texture or flavor can be imparted to food products *after* they leave the retort, the Delham Company specified Foxboro Elapsed-Time Temperature Controllers to insure maximum retention of these qualities during the processing.

Here's why Foxboro Elapsed-Time Temperature Controllers provide two-way flavor protection almost impossible to maintain by manual control. As soon as retort temperature reaches the required degree, these improved automatic food-processing controllers "take over" and hold it *on the button* throughout the cook. Further, through a simple setting on the outside of the case, they automatically time the cook... shut off steam at the end of the cooking period, and light a signal lamp to call the operator's attention. *There's no chance of undercooking or overcooking... no need for continuous watching by the operator.*

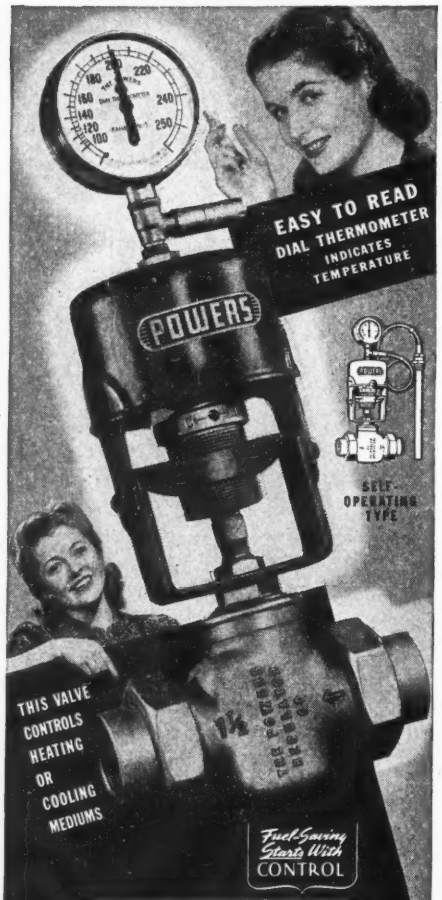
Full details of these automatic time- and flavor-saving retort controllers will be sent on request. Write to our nearby branch, or directly to **The Foxboro Company, 30 Neponset Ave., Foxboro, Mass., U. S. A.**

RECORDING · CONTROLLING · INDICATING

FOXBORO Instruments

Economize WITH POWERS

TEMPERATURE REGULATORS



Use a Powers No. 11 Temperature Indicating Regulator when you want the advantages of an easy-to-read dial thermometer combined with a dependable self-operating regulator. The dial thermometer gives a visual check on the performance of the regulator and makes it easy to adjust for the required operating temperature. Various dials and ranges are available.

Is Easy To Install—because both the thermometer and the regulator operate from the same thermal system—only one tapped opening is required.

Write for Circular 2511

THE POWERS REGULATOR CO.

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231 E. 46th St., New York 17, N. Y.—Offices in 47 Cities . . . See your phone directory.

70

OVER 50 YEARS
OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

of many of these manufacturing problems. Undoubtedly there are other instances where its use will solve quality or mechanical problems.

Not Limited

Also, the cooler is not limited in use to cooling viscous products. It is well adapted for cooling milk on the producing farms. Freshly drawn milk universally contains microorganisms varying in number in proportion to the care exercised in production. If the freshly drawn milk is cooled rapidly and completely, growth of the microorganisms is prevented. This result is essential in the production of high quality, low count milk, particularly for infant and convalescent feeding.

Size and construction of the unit used for cooling cans of cream are by no means the only size and construction that can be used. The unit lends itself to various designs to handle different volumes of material. The principle utilized in the shape and details of the cooling cylinder offers promising possibilities in the cooling of relatively large volumes of liquids in receiving or food processing plants.

Cost Is Low

The original cost of the direct expansion unit cooler, in all probability, will not vary greatly from the cost of the cabinet type coolers operating on the water-bath principle. The operating cost is low because the unit consumes current only when actually in operation. The figures obtained thus far on cream station operations indicate that a saving in cost of electricity of approximately 50 percent can be expected when a cabinet-type water-bath cooler is replaced with a direct-expansion unit cooler of the Erickson design.

—End—

Chemists Helped Britain To Weather the War

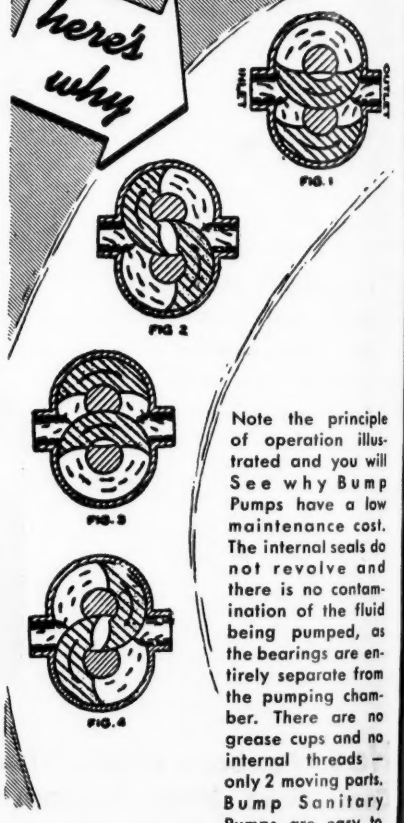
(Continued from page 101)

not on nutritional grounds, to enforce 85 percent flour. At first, the millers produced a meal of high fiber content (say 1.0 percent) rather than a flour. Later, by means of improved milling methods, they made a flour of only about 0.4 percent fiber at this extraction. This led to the excellent research into the distribution of the various vitamins in the grain, which culminated in the discovery that 60 percent of the total B_1 resided in only 1.5 percent

BUMP PUMPS

WILL DO YOUR PUMPING JOB *Better!*

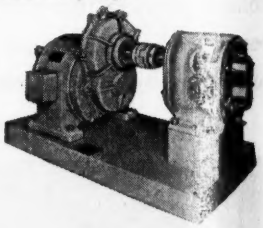
here's why



Note the principle of operation illustrated and you will See why Bump Pumps have a low maintenance cost. The internal seals do not revolve and there is no contamination of the fluid being pumped, as the bearings are entirely separate from the pumping chamber. There are no grease cups and no internal threads — only 2 moving parts. Bump Sanitary Pumps are easy to clean and easy to maintain.

As one food processing company that has been using a large number of Bump Pumps in operation for years says: "We use Bump Pumps because, in our opinion, they do a better job at a lower total cost to us than any other pump now offered on the market".

Bump Sanitary Pumps are positive action, self-priming under head pressures, and deliver a constant volume per revolution, regardless of speed or pressure. They can be operated at slow speed without churning action, vibration or agitation within the pump.



Available in capacities from 1/2 to 300 GPM. Illustrated is Bump Sanitary Direct Drive model, one of the models in the complete line. Fully illustrated catalog upon request.

The BUMP PUMP CO.
LA CROSSE ★ WISCONSIN

NEWS YOU'VE BEEN WAITING FOR...

"Stainless Steel has been released for civilian use"

MAKERS and users of food processing equipment who have been handicapped by the wartime restrictions on stainless steel will welcome this announcement.

While it does not mean that U·S·S Stainless Steel will be immediately available in unlimited quantities—military needs still having preference—it does assure that more and more U·S·S Stainless Steel will be increasingly forthcoming.

So, if you have been planning to give your equipment the practical, money-saving advantages that only stainless offers, order it now and make it a point to specify "preferably of U·S·S Stainless Steel."

For U·S·S Stainless Steel is a *perfected,* time-tested product. There's no better stainless made. Wherever used it helps to increase output, to lower costs and to keep quality uniformly high.

The high strength of U·S·S Stainless Steel, its superior resistance to so many of the organic and inorganic acids, its ability to preserve natural flavor and color, its greater ease of cleaning and the fact that it stands up and looks like new after years of hard service, are unique advantages that pay off big. No one knows this better than those owners of U·S·S Stainless equipment who have watched it consistently outperform less efficient materials during these years of stepped-up production.

*As you face the problems of post-war competition your ability to produce a better product at a lower price will meet its keenest test. Put your equipment in the best competitive position by incorporating, where it will do the most good, the finest stainless steel produced — *U·S·S* Stainless Steel. Our new book "U·S·S Stainless Steel in the Food Handling and Processing Industries" tells the whole story.

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
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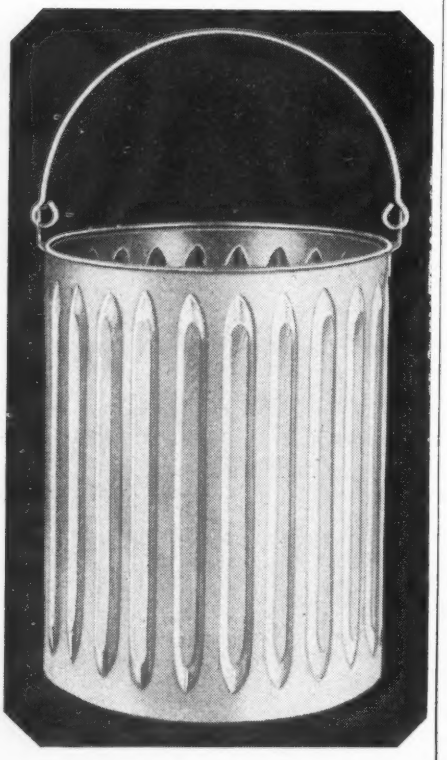
UNITED STATES STEEL *Presents* THE THEATRE GUILD ON THE AIR *Every* SUNDAY EVENING AMERICAN Network (Blue)

UNITED STATES STEEL

STAINLESS STEEL PAILS

READY FOR IMMEDIATE DELIVERY!



5 GAL. CAPACITY

Size 10½" x 16"

$8.75 each while they last!

Stainless Lids, if desired, $1.25

A limited quantity of these pails was manufactured from a *surplus* of aviation stainless steel. Naturally, when this lot is gone there will be no more. Hundreds are already in use in food and chemical plants.

If orders for these pails are received this month, we will ship anywhere in the U. S. A. at our expense.

Send for descriptive literature.

MASTERCRAFT PRODUCTS

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Philadelphia 23, Penna.

of the berry, the portion known as the scutellum. The problem was to mill so as to include the majority of the scutellum in the flour sack and to exclude the branny fibrous portions which were not really rich in B_1. If it had not been for the shipping-space problem, it is probable that the enrichment-of-bread policy would have been followed. Indeed, at one time, white flour enriched with vitamin B_1 was introduced officially and was compulsory in certain districts.

Flour Improved

Today, the extraction has been reduced to 80 percent. This flour has only 0.2 percent fiber but still contains 2.4 μg per gram of B_1, 0.85 μg per gram of riboflavin, 16μg per gram of nicotinic acid and 1.65 mg per 100 g. of iron. The color is much better than would have been expected for a flour of this extraction in prewar days. Of course, such flour is not of as good color as the enriched white flour in U.S.A. Nor is it as rich in the principal B vitamins.

At present, a government inquiry is determining the nature of the postwar loaf. Whether this will mean that flour will have to be milled to a set extraction so as to comply with certain vitamin standards or whether — as the writer hopes, since he believes it to be the best all-round policy—the principle of enrichment will be pursued as in the U.S.A. is in the lap of the Gods. So far, the meetings have been private and the public does not know what is happening. It is to be hoped that public opinion will not be ignored—the matter is too important for that.

Error in Eire

The problem of flour extraction is not easy, since consideration must be given to the provision of milling byproducts for animal feeding. Again, it is easy to make serious mistakes, as instanced by what took place recently in Dublin, Eire. Admittedly, the diet of the children of the poorer classes in Dublin is far from satisfactory. Owing to insufficiency of vitamin D and a low milk consumption, the intake of calcium is not as high as is desirable. However, no serious trouble arose until, owing to the war conditions, the flour extraction was raised to 100 percent. Within a few months—apparently because the phytic acid in the whole meal threw the calcium out of the diet- -incipient rickets started to develop in young children. The incident was as high as 50 percent for children under two years of

Your comprehensive guide to the chemical process industries

A reference manual of present-day procedures — broken down into unit processes and unit operations.

THIS important new 957-page manual makes available in handy reference form a tremendous compilation of authoritative data on the most modern procedures used in the manufacturing of chemicals and chemical products. Here you have a cross-section of the chemical process industries, with the basic procedures for each analyzed and described by flow sheets showing the unit processes and unit operations.

THE CHEMICAL PROCESS INDUSTRIES

By R. Norris Shreve

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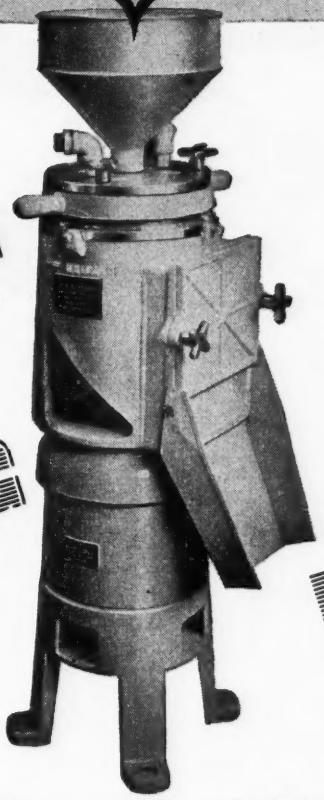

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—End—

Tartrates Recovered From Winery Wastes

(Continued from page 79)

For the above reasons it is imperative to arrive at the right pH value. If the material to be precipitated is rich in its concentration of cream of tartar—as in the first run of table or dessert wine lees slop—but not clean and clear, care should be taken to stay close to or under a pH of 4.8. Should the material be absolutely brilliant, however, a higher pH may be allowed. The recovery of calcium tartrate will be higher when the physical condition of the waste material warrants a pH of 5.3 to 5.6.

There is no set rule, governed by the equation mentioned above, as to the specific pH for each batch. It is the experience of the operator and his knowledge of these materials and their behavior that is most important in this respect. However, the author recommends the following precautions pertaining to pH points in this recovery process:

Should lees material (dessert or table) show a lower concentration than 0.1 lb. per gallon of calcium tartrate and a cloudy condition, the pH point should not exceed 4.2 to 4.4. In clear material of this type the pH can be as high as 4.8 to 5.0.

Cleanliness of the material is the determining factor in precipitating calcium tartrate from distillery slop, where average concentrations are about 0.03 lb. of cream of tartar per gallon. If slops are clarified prior to precipitation, a higher pH may be attained with safety. However, if calcium tartrate is precipitated from nonclarified slop, the pH should be maintained under 4.4 to produce a quality product.

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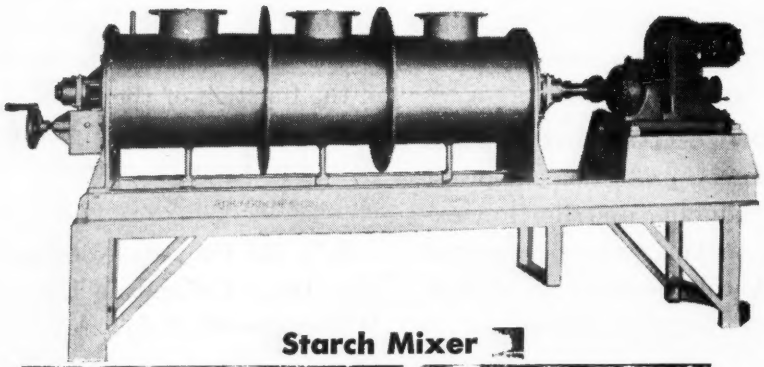

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From the equation, it is evident that the amounts of $CaCl_2$ and CaO to use are, respectively, 110.99 g. and 56.09 g. This is equivalent to about 0.3 lb. of $CaCl_2$ and 0.2 lb. of CaO per pound of cream of tartar. From actual experience it was found that an excess of $CaCl_2$ is desirable. The usual addition of this salt is ½ lb. per pound of cream of tartar. Since the CaO is added to a certain pH, it is not added by weight as is the chloride.

Tartrates from Wine Stones

Wine is stored, for various purposes, in tanks and, during storage, cream of tartar will crystallize out of the wine and form on the sides of the tanks. There are two methods for removing this formation from tanks, the most commonly used is manual chipping of the material from the inside surfaces, although some wineries use an extraction process employing either hot water, acid or alkaline extraction where the tartrates are recovered as calcium tartrate. The material produced from chipping is washed, dried and shipped as crude argols, which are called "wine stones."

Economic Observations

Space can not be given here to a complete consideration of the economic values to the winery of tartrate recovery from each of its sources. An examination of recovery from distilling material still slop, however, may prove valuable since the process is very recent and has come into its own only in the last three years.

A winery with a daily distilling output of 100,000 gal. should realize enough profit from the tartrates produced in one grape season (from eight to fourteen weeks) from still slop to defray largely the expenses of building and equipping the tartrate extraction plant.

A fair percent of recovery can be expected of this 100,000 gal. of distilling material slop. With an average concentration figure of 0.03 lb. of cream of tartar per gallon of slop, it should average approximately 3,000 lb. of cream of tartar.

When this entire theoretical amount is converted into calcium tartrate, the weight of the latter would be 4,140 lb. at its maximum purity of 57.6 percent tartaric acid. However, the solubility factor of calcium tartrate enters this equation. Approximately 0.01 lb. of calcium tartrate will be soluble in the treated slop at the temperature of operation and this soluble portion

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cannot be recovered. Thus two-thirds of 4,140, or about 2,760 lb., can be recovered per day.

Considering average purity of tartaric acid (54.5 percent) and the present market prices, the amount produced will be valued at close to $700.

Since no charge should be made by the winery against the ram material, which is waste, the profits realized are solely determined by the difference between receipts for the material produced and the cost or depreciation of equipment and expenses involved in production. Usually two men are able to take care of all the work involved.

The Uses of Tartrates

The crude tartrates, produced by the winery, are the raw materials for the production of tartaric acid and its derivatives. The uses to which these chemicals are put are many and varied, among which are baking, silvering glass, galvanoplastics, in dyeing and printing fabrics, photography, tanning, medicine, in chemical reagents and in many war-chemical industries.

The wine industry, realizing the critical need of tartrates during the war, did a great deal to cooperate with the government in the production of these needed materials.

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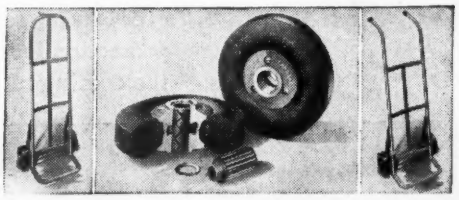

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